U.S. Army Center for Health Promotion and Preventive Medicine

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TRAINING MUNITIONS HEALTH RISK
ASSESSMENT
NO. 39-EJ-1485-00
RESIDENTIAL EXPOSURE FROM INHALATION OF
AIR EMISSIONS FROM THE
M17 .50 CALIBER TRACER CARTRIDGE
DEPARTMENT OF DEFENSE IDENTIFICATION CODE: A571



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U.S. Army Center for Health Promotion and Preventive Medicine

The lineage of the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) can be traced back over 50 years. This organization began as the U.S. Army Industrial Hygiene Laboratory, established during the industrial buildup for World War II, under the direct supervision of the Army Surgeon General. Its original location was at the Johns Hopkins School of Hygiene and Public Health. Its mission was to conduct occupational health surveys and investigations within the Department of Defense's (DOD's) industrial production base. It was staffed with three personnel and had a limited annual operating budget of three thousand dollars.

Most recently, it became internationally known as the U.S. Army Environmental Hygiene Agency (AEHA). Its mission expanded to support worldwide preventive medicine programs of the Army, DOD, and other Federal agencies as directed by the Army Medical Command or the Office of The Surgeon General, through consultations, support services, investigations, on-site visits, and training.

On 1 August 1994, AEHA was redesignated the U.S. Army Center for Health Promotion and Preventive Medicine with a provisional status and a commanding general officer. On 1 October 1995, the nonprovisional status was approved with a mission of providing preventive medicine and health promotion leadership, direction, and services for America's Army.

The organization's quest has always been one of excellence and the provision of quality service. Today, its goal is to be an established world-class center of excellence for achieving and maintaining a fit, healthy, and ready force. To achieve that end, the CHPPM holds firmly to its values which are steeped in rich military heritage:

- ★ Integrity is the foundation
 - ★ Excellence is the standard
 - ★ Customer satisfaction is the focus
 - ★ Its people are the most valued resource
 - ★ Continuous quality improvement is the pathway

This organization stands on the threshold of even greater challenges and responsibilities. It has been reorganized and reengineered to support the Army of the future. The CHPPM now has three direct support activities located in Fort Meade, Maryland; Fort McPherson, Georgia; and Fitzsimons Army Medical Center, Aurora, Colorado; to provide responsive regional health promotion and preventive medicine support across the U.S. There are also two CHPPM overseas commands in Landstuhl, Germany and Camp Zama, Japan who contribute to the success of CHPPM's increasing global mission. As CHPPM moves into the 21st Century, new programs relating to fitness, health promotion, wellness, and disease surveillance are being added. As always, CHPPM stands firm in its commitment to Army readiness. It is an organization proud of its fine history, yet equally excited about its challenging future.

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TRAINING MUNITIONS HEALTH RISK ASSESSMENT NO. 39-EJ-1485-00 RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS FROM THE M17 .50 CALIBER TRACER CARTRIDGE

EXECUTIVE SUMMARY

This assessment evaluated the potential for human health effects to offsite residents breathing air emissions following use of the M17 .50 Caliber Tracer Cartridge (M17) on firing ranges during training exercises.

To conduct this assessment, air emissions from the M17 were collected in a test chamber at the U.S. Army Aberdeen Test Center, Maryland. The data collected from the Firing Point Emission Study provided the amount and types of substances released from the M17. This information was then used in an air dispersion model to determine ambient air concentrations at locations downwind from the M17 firing location. Since the training facility in this assessment is hypothetical, the air model used assumptions that provided conservative estimates of air concentrations.

Modeled air concentrations were combined with exposure information (e.g., number of cartridges used per year) to estimate the amount of each substance the hypothetical offsite resident breathes. This estimate was then compared with the substance's health-based screening level, which was obtained from agencies such as the U.S. Environmental Protection Agency, to determine if there is a potential for health effects from inhalation.

The health risk assessment included both long-term (30 years) and short-term (15-minute or 1-hour) exposures to modeled substance concentrations. Assessment results, generated using conservative methods, showed that the hypothetical offsite resident breathing air as close as 200 meters (656 feet) from the M17 firing location is safe from these emissions. At locations where offsite residents are located less that 200 meter from the M17 firing locations, a more site-specific evaluation is necessary. It should be noted that at most training installations, training areas are over 1,000 meters (over half a mile) away from populated areas.

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LIST OF ACRONYMS

AEC U.S. Army Environmental Center

AEGL Acute Exposure Guideline Levels

AIHA American Industrial Hygiene Association

Al Aluminum

ATC U.S. Army Aberdeen Test Center

ATV Acute Toxicity Value

CO₂ Carbon Dioxide

DODIC Department of Defense Identification Code

DOE U.S. Department of Energy

EPA U.S. Environmental Protection Agency

ERPG Emergency Response Planning Guidelines

HBSL Health-Based Screening Level

INPUFF Integrated PUFF Model

NAAQS National Ambient Air Quality Standards

NEW Net Explosive Weight

OEL Occupational Exposure Limit

PM_{2.5} Particulate Matter under 2.5 microns in size

PM₁₀ Particulate Matter under 10 microns in size

PRG Preliminary Remediation Goals

RBC Risk-Based Concentration

RfC Reference Concentration

TEEL. Temporary Emergency Exposure Limits

TPH Total Petroleum Hydrocarbons

TSP Total Suspended Particulates

USACHPPM U.S. Army Center for Health Promotion and Preventive Medicine

TRAINING MUNITIONS HEALTH RISK ASSESSMENT NO. 39-EJ-1485-00 RESIDENTIAL EXPOSURE FROM INHALATION OF AIR EMISSIONS FROM THE M17 .50 CALIBER TRACER CARTRIDGE

PURPOSE

This document presents the assessment of the potential for human health effects to offsite residents breathing air emissions following use of the M17 .50 Caliber Tracer Cartridge (M17) on firing ranges during training exercises.

2. AUTHORITY

Statement of Work, 30 November 2000, Training Munitions Inhalation Risk Evaluations.

3. REFERENCES

See Appendix A for a list of references.

4. BACKGROUND

4.1 CARTRIDGES AND THEIR USE

Cartridges are cases that contain a primer, propelling charge, and projectile. The primer is needed to activate the propelling charge, which provides the force to send the projectile to a target. Examples of projectiles include bullets, rockets, and missiles. Cartridges are also referred to as "rounds" and are fired from weapons such as pistols or rifles.

4.2 WHAT IS THE M17?

The M17 is a tracer cartridge, which is used to track the path of the bullet. When fired at night, the tracer leaves a visible trail to show the direction in which the bullet is traveling. Each tracer cartridge is about as long as the length of a soda can and can be identified by its brown tip (Reference 1).

The M17 has a brass cartridge case and a bullet consisting of a brass jacket and steel core. It also contains a propelling charge that is made up mostly of nitrocellulose. Nitrocellulose is commonly used in the production of lacquers and artificial leathers. It is a primary ingredient in smokeless propellant for both military and commercial use.

4.3 USE OF THE M17

The M17 is fired from .50 caliber machine guns. Each weapon operates differently and is used for different functions. Training with the M17 is very important as

it teaches our soldiers to operate these weapons safely and effectively. This will prepare them for combat situations.

4.4 ASSESSMENT SUMMARY

The general assessment approach consisted of two main parts: air dispersion modeling and exposure assessment, which are briefly discussed in the paragraphs below. Sections 5 through 7 present a discussion of the methodology used for this assessment.

Emissions data used in the air dispersion modeling were obtained from the Firing Point Emission Study, conducted by the U.S. Army Aberdeen Test Center (ATC), at Aberdeen Proving Ground, Maryland (Reference 2). This assessment was funded by the U.S. Army Environmental Center (AEC) with the purpose of identifying and quantifying emissions from weapons firing. Data from this study were generated by firing munitions in a test chamber with weapons that are representative of those used by the U.S. Army during training operations. Emissions data for the M17 were generated by firing it from the M2 machine gun.

The emissions data for the M17 were used with an atmospheric dispersion model to estimate the average concentrations that may be experienced by an offsite resident. Since this assessment is designed to provide results that would be applicable to most Army training facilities, the training area used in this assessment was a hypothetical one. While most training areas are at least 1,000 meters away from populated areas, as a conservative distance, it was initially assumed that a person could reside 100 meters downwind from the firing point (location where the machine gun is positioned). In addition, air-modeling parameters were selected to mimic worst-case conditions.

The exposure assessment included calculations of time-averaged concentrations for both long-term (chronic) and short-term (acute) exposures. For the purpose of this assessment, air concentrations were averaged over 30 years for chronic exposures and 1-hour or 15 minutes for acute exposures. Using a screening approach, a substance's estimated time-averaged air concentration was then compared to chronic health-based screening levels (HBSLs) established by the U.S. Environmental Protection Agency (EPA) or acute toxicity values (ATVs) established by selected agencies depending on the exposure duration (i.e., 30 years versus 1-hour or 15 minutes). The comparison was made using the ratio of the HBSL or ATV to estimated air concentration for each of the substances evaluated. If this ratio was less than one, no further evaluation was needed. This approach is conservative because the exposure assumptions used by the agencies, to establish HBSLs and ATVs, are likely to overestimate the exposures experienced by offsite residents living near firing ranges. If the chronic or acute averaged concentrations (C_{chronic} and C_{acute}) were greater than these screening levels, producing a ratio greater than one, further analysis would be warranted to determine the potential for health effects. Note that concentrations greater than the screening levels do not indicate an onset of health effects, but rather the potential for such.

5. DATA COLLECTION AND AIR MODELING

5.1 EMISSION FACTORS

Emission factors, used to derive the air modeling emission rates used in this assessment, were generated from the Firing Point Emission Study conducted by the ATC (Reference 2). The data provided by the ATC included the net explosive weight (NEW), the substances sampled, and substance-specific emission factors. Emissions data from the Firing Point Emission Study are included in the first four columns of the table located in Appendix B.

5.2 BACKGROUND AND DESCRIPTION

Air dispersion models are available to mathematically simulate plume behavior and to estimate downwind concentrations of substances emitted from various sources. However, specific models are not available to determine the dispersion of emissions from munitions used during training. Estimating the magnitude and location of these concentrations depends on many factors including the amount and type of emissions, the behavior of the source, and meteorological conditions. Since a specific model is not available for modeling the use of munitions during training, the U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM) evaluated numerous air models to determine which would be suitable for use with munitions used during training. The USACHPPM recommended using the Integrated PUFF (INPUFF) model to estimate the dispersion of emissions from various munitions sources (Reference 3).

The INPUFF Model (Reference 4) was developed to simulate dispersion from instantaneous or semi-continuous point sources. This Gaussian-integrated puff model is capable of addressing a cloud type release over short periods of time, and computations can be performed for a single point source for multiple receptors. The algorithms used to calculate concentrations assume a vertically uniform wind direction (with no chemical reaction) to compute the contribution of each cloud at a receptor for each time step/interval.

5.3 MODEL ASSUMPTIONS

Some assumptions were made to best represent the firing of the M17 cartridges. These assumptions were as follows:

Typically, with conventional point sources (such as incinerators), the cloud rise and formation are determined by characterizing flue gas exit velocity, temperature, and stack diameter. However, the M17 cartridges are used in conjunction with machine guns. For unconventional sources with no real physical stack dimensions, such as machine guns, the stack height and diameter were assumed to be equal to the height of the barrel and the bore diameter. No exit velocity was used with this source because the emission rates generated from the test data were obtained from sampling a stabilized

cloud with no exit velocity. Table 1 includes the source parameters used to model the M17 cartridges.

TABLE 1: SOURCE PARAMETERS

Parameter	Model Input
Source/Stack Diameter	0.01 meters
Source/Stack Height	1 meter
Source Exit Temperature	298.15 degrees Kelvin (°K) (or 77 °F)
Exit Velocity	0 meters/second
Initial horizontal dispersion coefficient (σ_y)	0.87 meters
Initial vertical dispersion coefficient (σ_z)	1.07 meters

- Initial cloud dimensions are preferred to model the air emissions from these types of releases. The dimensions are used to define the initial horizontal and vertical dispersion values (σ_y and σ_z) of the released cloud. This information was not measured during the studies at the ATC; therefore, the cloud dimensions were based on the test chamber dimensions and the volume of air sampled. By assuming an elliptical cloud with the prevailing wind direction being perpendicular to the muzzle when fired, the test chamber's radius would be equal to the initial vertical dispersion (σ_z), and the initial horizontal dispersion (σ_y), would be equal to one half the length of the test chamber. The cloud exit temperature was assumed to be equal to the test chamber temperature.
- ➤ For the purposes of this assessment, a hypothetical offsite resident was assumed to be located first at 100 meters, then at 200 meters directly downwind from the source. The meander of the cloud is a major factor when estimating concentrations at given locations downwind from the source. Assuming that the resident is directly downwind from the source is the same as assuming that there is no cloud meander and that the center of the cloud migrates directly over the hypothetical offsite resident. This assumption provides the most conservative modeled concentrations.
- Since this assessment does not look at a specific training site, generic, worst-case meteorological data were used. To determine the worst-case meteorological conditions that would result in the highest air emission concentrations, the modeling was performed using the EPA Risk Management Program Guidance (Reference 5). This guidance includes tables for estimating the footprint of chemical releases and is intended to inform emergency responders of potential accidental releases. The EPA has defined most default conditions for meteorological modeling parameters. Table 2 lists the meteorological parameters that were used in the air model.

TABLE 2: WORST-CASE METEOROLOGICAL PARAMETERS

Parameter	Input Value
Wind Speed	1 meter/second
Atmospheric Stability	Category F
Wind Direction	270°
Ambient Temperature	293 degrees Kelvin (°K) (or 68 °F)

5.4 GENERAL METHODOLOGY

The model was run for a total calculation time of 200 seconds for the 100-meter location and 300 seconds for the 200-meter location. This was done to simulate a single round being fired and to ensure that the total mass of the cloud had passed the hypothetical resident locations. Concentrations were calculated every 2 or 3 seconds, depending on the location being modeled. The model results indicated that the initial cloud reached the hypothetical offsite resident at 200 meters within 154 seconds and dissipated below the lowest concentration the model calculated (1 x $10^{-12} \, \text{g/m}^3$) within 275 seconds. Table 3 contains the air model input parameters used in this assessment.

TABLE 3: AIR MODEL INPUT PARAMETERS

TABLE 3. AIR MODEL IN 3117/13 MILE 12:13	Input	Value
Parameter	100 meters	200 meters
Number of meteorological periods (NTIME)	1	1
Duration of each meteorological period (ITIME)	200 seconds	300 seconds
Number of updates to the source (NSRCDS)	100	100
Duration/time step between each source update (ISUPDT)	2 seconds	3 seconds
Total time modeled/Simulation Period (NTIME) (ITIME)= (NSRCDS) (ISUPDT)	200 seconds	300 seconds

5.5 USE OF MODEL OUTPUT

The concentrations provided by the INPUFF model were based on a unit emission rate (ER_{unit}) of 1 gram/second from an emission source, and did not represent any substance-specific concentrations from the use of any weapons system. This unit emission rate is typically used for ease of modeling purposes. The relationship between the emission rate and predicted concentration is linear. Therefore, the ratio of the predicted concentration to the unit emission rate was multiplied by each substance-specific emission rate to provide substance-specific concentrations.

5.6 DETERMINATION OF SUBSTANCE-SPECIFIC EMISSION RATES

The actual substance emission rate for one item (ER₁) for each substance was calculated using Equation 1. Example 1 contains a sample calculation using this equation.

$$ER_1 = \frac{EF \cdot CV}{t}$$
 Equation 1

Where:

ER₁ = emission rate for one item ((g/item)/sec)

EF = average adjusted emission factor (lb/item)

CV = conversion factor (453.59 g/lb)

t = release duration obtained from the INPUFF model (sec)

Example 1 Sample Calculation Using Equation 1:

$$ER_1 = \frac{(5.69 E - 03) (453.59)}{(3)}$$

= 8.610 E-01 g/sec

Calculation provided for Carbon Dioxide (CO_2) at the 200-meter location. Appendix B provides the average adjusted emission factor of CO_2 in lb/item.

Substance-specific ambient concentrations for one item (CONC) were calculated using Equation 2. A sample calculation using this equation is provided in Example 2. Appendix B contains the estimated air concentrations for both the 100 and 200-meter locations.

$$CONC = ER_1 \cdot \frac{UC}{ER_{unit}}$$
 Equation 2

Where:

CONC = substance concentration based on one item (g/m³)

 ER_1 = emission rate for one item (g/sec)

 ER_{unit} = unit emission rate as used in the model (g/sec)

UC = concentration based on the unit emission rate (g/m³)

Example 2 Sample Calculation Using Equation 2:

$$CONC = (8.610E - 01) \frac{(6.870E - 05)}{(1)}$$

 $= 5.915E-05 g/m^3$

Calculation provided for CO₂ at the 200-meter location.

6. RISK ASSESSMENT

6.1 EXPOSURE ASSUMPTIONS

Exposure assumptions were selected using a typical use scenario for the M17 during training exercises. The typical use scenario was provided by the AEC and is based on consultation with their senior training advisor (References 6, 7). The frequency of use for the M17 was required to determine how much substance an offsite resident would be exposed to in the time period of interest (i.e., acute or chronic exposure). Table 4 summarizes the general use scenario for the M17.

TABLE 4: FREQUENCY OF USE FOR THE M17

Parameter	Value Used
Number of cartridges used per year	323,952
Maximum number of cartridges used in 1- hour	3,000

6.2 TIME-AVERAGING

For the chronic assessment, time-averaged concentrations were calculated by assuming that the hypothetical offsite resident would be exposed for 30 years. This is consistent with the exposure duration used by the EPA, which assumes that the resident spends 30 years at the same residence. By using the same exposure duration,

the estimated time-averaged concentrations can be compared with their respective HBSLs, which are derived using standard EPA default assumptions.

Using the default residence time established by the EPA, the assumption was made that someone could be exposed to air emissions from 323,952 cartridges per year for 30 years. Table 5 lists the exposure parameters used to estimate concentrations for the chronic assessment. These parameters are based on the typical use scenario provided by the AEC (Table 4) and the assumptions used in the air model run.

TABLE 5: EXPOSURE PARAMETERS USED TO DETERMINE TIME-AVERAGED CHRONIC AIR CONCENTRATIONS

	Value	e Used
Exposure Parameter	100 meters	200 meters
Exposure Time (ET _{ctg})	3.33 min/cartridge ¹	5 min/cartridge ¹
Exposure Frequency (EF _{ctg})	323,952 ca	rtridges/year
Exposure Duration (ED)	30 y	ears ²

¹Based on the total model time of 200 seconds (3.33 minutes) or 300 seconds (5 minutes) used in the air model run.
²EPA default value.

Chronic averaged concentrations were calculated using Equation 3. Example 3 shows how this calculation was performed using the total suspended particulates (TSP) concentration at 200 meters as an example. Since TSP is classified as a noncarcinogen, the averaging time (AT) is the same as the exposure duration.

$$C_{chronic} = \frac{CONC \cdot 10^6 \cdot ET_{ctg} \cdot EF_{ctg} \cdot ED}{525,600 \cdot AT}$$
 Equation 3

Where:

 $C_{chronic}$ = average chronic concentration (μ g/m³)

CONC = average modeled concentration for one cartridge (g/m³)

 10^6 = unit conversion (µg/g)

 ET_{ctg} = exposure time per cartridge (minutes/cartridge)

 EF_{cta} = exposure frequency (cartridges/year)

ED = exposure duration (years)

525,600 = unit conversion (minutes/year)

AT = averaging time (years)

(carcinogenic endpoint: AT = 70 years noncarcinogenic endpoint: AT = ED)

Example 3 Sample Calculation Using Equation 3:

$$C_{chronic(TSP)} = \frac{(4.277 \text{E} - 06)(10^6)(5)(323,952)(30)}{(525,600)(30)}$$

 $= 1.32E+01 \mu g/m^3$

Appendix B provides the average modeled concentration for one cartridge (CONC). Table 5 includes the exposure parameters.

Unlike the chronic assessment, only limited guidance for evaluating acute exposures is currently available. Since many cartridges may be fired in a short period of time, however, acute exposures cannot be overlooked. For the purpose of this assessment, acute exposure is defined as a 1-hour or 15-minute exposure. The 1-hour or 15-minute acute exposure averaging times allow for comparison with guidelines developed specifically for emergency planning purposes (see discussion on acute toxicity below).

The exposure frequency is based on the number of cartridges used per 1-hour or 15 minutes depending on the guideline used for comparison. This information is based on the use scenario provided in Table 4. To estimate air concentrations for potential acute health effects, it was conservatively assumed that 3,000 M17s are fired in 1- hour. The average acute concentrations were computed using Equation 4. Example 4 contains a sample calculation at 200 meters using this equation. Since TSP does not have an ATV, aluminum (AI) is used as the example substance.

$$C_{acute} = \frac{CONC \cdot 10^6 \cdot ET_{ctg} \cdot EF_{ctg}}{60}$$
 Equation 4

Where:

 C_{acute} = average acute concentration ($\mu g/m^3$)

CONC = average modeled concentration for one cartridge (g/m³)

 10^6 = unit conversion (µg/g)

ET_{cta} = exposure time per cartridge (minutes/cartridge)

 EF_{ctq} = exposure frequency (cartridges/hour)*

= unit conversion (minutes/hour)

* Based on 1-hour or 15 minute (0.25 hour) ATV

Example 4 Sample Calculation Using Equation 4:

$$C_{acute(Al)} = \frac{(9.060E - 09)(10^6)(5)(3,000/0.25)}{60}$$
$$= 9.06E + 00 \ \mu g/m^3$$

Appendix B provides the average modeled concentration for one cartridge (CONC) for Al.

6.3 TOXICITY ASSESSMENT

The potential for health effects was determined by comparing time-averaged air concentrations to HBSLs and ATVs, which are developed from a substance's known toxicity. These toxicity values typically include different levels of safety factors depending on the level of confidence of the critical study. Appendix C contains a table of screening toxicity values used for the chronic and acute assessments.

6.3.1 CHRONIC ASSESSMENT

The chronic assessment was conducted using a screening approach. Using this method, a substance's estimated time-averaged air concentration was compared to its HBSL. If this ratio was less than one, no further analysis was required. This approach is conservative because the exposure assumptions used by the EPA, to establish HBSLs, assume that the resident is continuously exposed for 350 days per year (assuming 2 weeks vacation per year). In contrast, exposure to air emissions from actual training activities at a firing range is intermittent and is not likely to occur on a daily basis year round.

A hierarchy of sources was developed for selection of the HBSLs to quantitatively evaluate as many of the identified substances as possible. The hierarchy of sources used was as follows:

- Clean Air Act, EPA National Ambient Air Quality Standards (NAAQS) (Reference 11)
- > EPA Region 9 Preliminary Remediation Goals (PRGs) (Reference 10)
- > EPA Region 3 Risk-Based Concentrations (RBCs) (Reference 9)

Some substances have neither PRGs nor RBCs because they have their own set of regulatory standards. Under the Clean Air Act, the EPA is required to establish NAAQS for several substances considered harmful to public health and the

environment. Currently, NAAQS are available for seven substances. The NAAQS for the longer averaging time were used for the chronic assessment. Depending on the substance, this can range from an 8-hour average to an annual average. In addition, since the majority of the measured TSP was PM₁₀ (particulate matter under 10 microns in size) (Reference 2), the NAAQS for PM₁₀ was used to evaluate the potential for health effects from exposure to TSP.

Next on the hierarchy, after the NAAQS, are the EPA Region 9 PRGs and the EPA Region 3 RBCs. Since the methodology used by EPA Region 9 to develop the PRGs generally results in lower values than the EPA Region 3 RBCs, the PRGs were first on the hierarchy of sources. RBCs were used when a PRG was not available. To ensure that the most recent information was used, the Internet sites of both EPA Regions were checked. The HBSLs used for this assessment are presented in Appendix C.

Although the general approach used by both EPA Region 3 and Region 9 is the same, the exposure assumptions differ enough so that final recommended values can vary to a certain degree. In both methods, a substance's screening concentration was selected using the toxicity endpoint that derives a lower concentration. For example, if a substance has a known systemic toxicity and is a carcinogen, the screening concentration was calculated using both toxicity values. To maintain a conservative approach, EPA then selected the lower screening concentration as the recommended PRG or RBC.

Example 5 shows a sample calculation of how a substance's estimated chronic concentration was compared to its HBSL using the TSP concentration at 200 meters.

Example 5 Sample Calculation Comparing a Substance's Estimated Chronic Concentration to Its HBSL:

$$\frac{C_{chronic(TSP)}}{HBSL} = \frac{1.32E + 01}{5.00E + 01}$$
$$= 2.64E-01 < 1$$

In this case, the resulting ratio is less than one, indicating further evaluation is not necessary.

Many petroleum hydrocarbons were detected but do not have specific screening levels. Therefore, the approach recommended by the Total Petroleum Hydrocarbon Criteria Working Group (Reference 12) was adopted to evaluate petroleum hydrocarbon mixtures. Based on the working group's assessment of various hydrocarbons, it was recommended that mixtures be separated according to a

substance's number of carbons and its chemical class (i.e., aliphatic or aromatic¹). Generally, as a substance's carbon number increases, its molecular weight increases, and it is, therefore, not a substance of concern via inhalation. The working group also concluded that aromatic hydrocarbons tend to be more toxic than aliphatic hydrocarbons (Reference 12). Table 6 tabulates the inhalation toxicity values used to evaluate exposure to petroleum mixtures. To be consistent with the methodology used in this assessment, the reference concentrations (RfCs) were converted to PRGs using Region 9 exposure assumptions. The resulting PRGs were used as the HBSLs for the petroleum hydrocarbons in this assessment. These values are presented in Appendix D.

TABLE 6: SUMMARY OF RfCs USED FOR PETROLEUM HYDROCARBONS1

Carbon Range	Aromatic Inhalation RfC (mg/m³)	Aliphatic Inhalation RfC (mg/m³)
C ₅ – C ₆ C _{>6} – C ₈		18.4
C>7 - C8	0.4	The state of the s
$C_{>8} - C_{10}$ $C_{>10} - C_{12}$ $C_{>12} - C_{16}$	0.2	1.0
C _{>16} – C ₂₁ C _{>21} – C ₃₅	NA	NA

Reference 13

NA = not applicable for high molecular weight TPHs (Total Petroleum Hydrocarbons) (C_{>16}) because substances in this carbon range are not volatile and therefore, inhalation is not a pathway of concern.

6.3.2 ACUTE ASSESSMENT

An established method for assessing acute health effects is not currently available. In 1995 the EPA recognized the need for acute exposure guidelines for emergency response purposes and created the National Advisory Committee for Acute Exposure Guideline Levels (AEGLs) for Hazardous Substances. Currently, AEGLs are available for only a few substances.

To overcome the absence of acute toxicity data, several state regulatory agencies have suggested that guidelines developed for emergency purposes be used in the interim. Although suggestions have been made to use occupational exposure limits (OELs) by applying additional safety factors (References 14, 15), OELs were not used in this assessment because they introduce even more uncertainty than the use of

¹ Aliphatic hydrocarbons are hydrocarbons in which the carbon atoms are joined by single covalent bonds consisting of two shared electrons (e.g., butane). Aromatic hydrocarbons have ring structures (e.g., benzene) (Reference 13).

emergency guidelines. The OELs are designed to protect the workplace environment, and assume 8 hours a day, 5 days a week exposures. By definition, these exposures are more chronic than acute.

In comparison, emergency planning guidelines are more appropriate because they are typically developed for exposures of 1-hour or less. In addition, safety factors are included as part of the guideline development, so that the values would be protective of the general population.

Emergency Response Planning Guidelines (ERPGs) published by the American Industrial Hygiene Association (AIHA) (Reference 16) and the Temporary Emergency Exposure Limits (TEELs) developed by the U.S. Department of Energy (DOE) (Reference 17) were used for this assessment, specifically the ERPG-1s and the TEEL-1s. Since TEEL-1s are intended for exposures up to 15-minutes, air concentrations compared to TEELs were averaged over a 15-minute period. Air concentrations compared to ERPGs and AEGLs were averaged over 1-hour, as these values are intended for 1-hour exposures.

For this assessment, the hierarchy of sources for ATV selection was as follows with each ATV defined below:

- ➤ EPA AEGL-1. "AEGL-1 is the airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic, nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure."
- ➤ AIHA ERPG-1. "The maximum concentration in air below which it is believed nearly all individuals could be exposed for up to 1- hour without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor."
- ➤ DOE TEEL-1. "The maximum concentration in air below which it is believed nearly all individuals could be exposed without experiencing other than mild transient adverse health effects or perceiving a clearly defined objectionable odor."

AEGLs were used first when available since they are developed specifically for the purpose of acute exposure assessments. The ERPGs were selected next, prior to a substance's TEEL, because they are vigorously reviewed before they are published whereas the TEELs are not.

Example 6 shows a sample calculation of how a substance's estimated acute concentration was compared to its ATV using the aluminum concentration at 200 meters.

Example 6 Sample Calculation Comparing a Substance's Estimated Acute Concentration to Its ATV:

$$\frac{C_{acute(Al)}}{ATV} = \frac{9.06E + 00}{3.00E + 04}$$
$$= 3.02E - 04 < 1$$

In this example with AI, the ratio is less than one, indicating that further analysis is not necessary.

7. RISK CHARACTERIZATION

As previously described, the exposure assessment included calculations of time-averaged concentrations for both long-term (chronic) and short-term (acute) exposures. Using a screening approach, a substance's estimated time-averaged air concentration was then compared to chronic HBSLs or ATVs. The comparison was made using the ratio of the HBSL or ATV to the estimated concentration. This approach is conservative because the exposure assumptions used by the EPA, to establish HBSLs and ATVs, are likely to overestimate the exposures experienced by offsite residents living near firing ranges.

If this ratio was less than one, no further evaluation was needed. If the chronic or acute averaged concentrations (C_{chronic} and C_{acute}) were greater than the screening levels, resulting in a ratio greater than one, further evaluation would be warranted to determine the potential for health effects. Note that concentrations greater than the screening levels do not indicate an onset of health effects, but rather, the potential for such.

The chronic and acute assessments were conducted as outlined in Section 6.3. Appendix D presents results from the M17 risk characterization.

7.1 CHRONIC HEALTH RISK

The chronic assessment, at the 100-meter downwind hypothetical offsite resident location, indicated that estimated concentrations of hydrogen cyanide, $PM_{2.5}$, barium, and 1,3-butadiene from the M17 emissions were greater than the HBSLs. The ratios of all other substances to their HBSLs were below one. Estimated concentrations of M17 air emissions were remodeled to a distance 200 meters downwind from the firing location. The results showed that the estimated concentrations of the four substances, which were greater than the HBSLs at 100 meters, all decreased to safe levels. The estimated concentrations for all other substances were further reduced with all ratios below one.

The ratio of the estimated hydrogen cyanide concentration to its HBSL was 2.14 at the 100-meter location. Hydrogen cyanide is a colorless gas with a faint, bitter, almond-like odor. It is naturally produced by some microorganisms and can be found in a number of foods and plants. Examples of industrial uses of hydrogen cyanide include chemical production, photographic development, and some mining processes. There are no reports that hydrogen cyanide causes cancer. Long-term inhalation of hydrogen cyanide may result in breathing difficulties, heart pains, vomiting, blood changes, headaches, and enlargement of the thyroid gland (Reference 17).

The ratio of the estimated $PM_{2.5}$ concentration to its HBSL was 1.12 at the 100-meter location. $PM_{2.5}$ refers to particulate matter that is 2.5 microns or less in size. The term particulate matter is used to refer to a mixture of solid particles and liquid droplets found in the air. $PM_{2.5}$ is a product of fuel combustion from sources such as automobiles, power plants, industrial processes, wood burning, and diesel-powered vehicles (Reference 18). $PM_{2.5}$ can penetrate deep into the lungs due to its small size. Inhalation of $PM_{2.5}$ has been linked to a series of health effects including asthma, bronchitis, and other respiratory system effects. Those most at risk are the elderly, children, and people with existing health conditions such as respiratory and cardiopulmonary diseases (References 19).

The ratio of the estimated barium concentration to its HBSL was 1.57 at the 100-meter location. Barium is a silvery-white metal that is naturally found in the environment. Barium compounds are also produced and used by industry and in medicine. The respiratory system is thought to be the primary system affected from barium inhalation. Studies have suggested that inhalation of barium may also be associated with systemic effects such as hypertension (Reference 20).

The ratio of the estimated 1,3-Butadiene concentration to its HBSL was 1.41 at the 100-meter location. 1,3-Butadiene is a colorless gas with a mild gasoline-like odor and is made from the processing of petroleum. 1,3-Butadiene is used to make rubber and plastics. 1,3-Butadiene is classified as a known human carcinogen based on occupational exposures and animal studies. Chronic inhalation has been associated with increased risk for lymph, blood, and digestive system cancers, diabetes mellitus, and arteriosclerosis (Reference 21).

7.2 ACUTE HEALTH RISK

The acute assessment, at the 100-meter downwind hypothetical offsite resident location, indicated that estimated copper and lead concentrations from the M17 emissions were greater than their ATVs. The ratios of all other substances were less than one. Estimated concentrations were remodeled to a distance 200 meters downwind from the firing location. The results showed that the estimated concentrations of copper and lead both decreased to safe levels. The estimated concentrations for all other substances were further reduced with all ratios below one.

The ratio of estimated copper concentration to the ATV was 1.10 at the 100-meter location. Copper is a naturally occurring reddish metal found in the earth's crust. Copper is widely used because it can be easily molded or shaped and may be mixed with other metals. The acute health effects from inhalation exposure to copper are not well known. However, some studies have indicated that short-term inhalation of copper may result in nose and respiratory irritation (Reference 22).

The ratio of estimated lead concentration to the ATV was 2.29. Lead is a naturally occurring bluish-gray metal found in the earth's crust in small amounts. It is commonly used in lead-acid batteries for automotive and industrial applications. Exposure to lead in the air primarily results from emissions from industrial processes. The main target for lead toxicity is the nervous system. Information is limited on the health effects from short-term inhalation exposure to lead (Reference 23).

Again, it should be noted that an estimated concentration, which is greater than the HBSL or ATV, does not indicate an onset of health effects, but rather the potential for such.

7.3 FACT SHEET

Appendix E includes a copy of the fact sheet submitted to the AEC. The fact sheet used results from this assessment to address health concerns related to inhalation of M17 air emissions.

8. UNCERTAINTY DISCUSSION

The limitations inherent in modeling and the added conservatism of the assessment contribute to the uncertainty of the assessment results. The risk assessment methodology typically includes safety factors that are embedded in the toxicity data to ensure adequate protection of the general population, particularly, susceptible individuals such as the sick, elderly, and children. Table 7 identifies areas of uncertainty associated with this assessment.

TABLE 7: TYPES OF UNCERTAINTY

Issue	Uncertainty	Direction of Effect
	Emissions Modeling	
Modeled versus real- time sampling	The air concentrations in this assessment were modeled. Actual air concentrations taken from the field may be higher or lower.	Varies
Frequency of use for the M17	Actual frequency of use for these munitions during training exercises may be different from those stated in this report.	Varies
Hypothetical offsite resident assumed to be located directly downwind	Unless the area around the training facility is populated, the chances that a person living directly downwind is low.	Overestimates
Use of worst-case meteorological conditions	To ensure that this assessment is applicable to most training areas, worst-case meteorological conditions were used in the air model.	Overestimates
	Exposure Assessment	
Estimating time- averaged concentrations	Actual exposure from the M17 is intermittent. If one were to plot a person's exposure profile, the plot would consist of a series of spikes. Since current risk assessment methodology does not allow the assessment of the potential for health effects as a function of time, a single concentration, averaged over the exposure duration was used. In this assessment, the exposure durations used were 30 years and 1-hour or 15 minutes.	Varies
Comparing estimated concentration to established screening levels	The Region 3 and Region 9 HBSLs were developed assuming that the resident is exposed 350 days per year. It is unlikely for training with the M17 to occur for 350 days per year at a particular firing range.	Overestimates
Comparing estimated concentrations to established screening levels	Comparison to screening levels does not account for possible cumulative effects of exposure to more than one substance.	Underestimates

TABLE 7: TYPES OF UNCERTAINTY

Issue	Uncertainty	Direction of Effect
Screening assessment versus calculating an average daily intake	Calculating an average daily intake allows the use of scenario-specific assumptions. However, unless the ratio of concentration to screening level approaches one, a screening assessment is useful as a first-cut evaluation.	Varies
Exposure to other munitions	Other munitions are typically used during the same training exercise. These items may contain similar or different substances from those detected in the M17 emissions.	Underestimates
	Toxicity Assessment	
Lack of toxicity data	Some substances were not quantitatively evaluated because they have no known toxicity data.	Underestimates
Modifying and uncertainty factors for toxicity data	Modifying factors and uncertainty factors of varying degree are typically applied to toxicological values. These factors are used to conservatively account for extrapolating from animal studies for human health evaluation, and to conservatively account for variation in human populations.	Overestimates

9. CONCLUSION

Using conservative assumptions, the assessment indicated that residents who live as close as 200 meters downwind from the firing location are safe from breathing air emissions from the M17. It is believed that the assumptions contained in this analysis are conservative enough to be protective of all the population including the sick, elderly, and children.

10. RECOMMENDATIONS

At installations where offsite residents are located less than 200-meters from the M17 firing location, a more site-specific evaluation is recommended. However, it should be noted that most training areas are located at least 1,000 meters (over half a mile) away from populated areas.

The results from this assessment are intended for a hypothetical training facility, and actual results can vary depending on site-specific conditions. This assessment used

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conservative assumptions (e.g., worst-case meteorological conditions, receptor located directly downwind, etc.) and it is believed that most site-specific analyses would result in even lower concentrations. Therefore, the results from this assessment should be applicable to most training facilities unless site-specific conditions vary significantly.

11. POINT OF CONTACT

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APPENDIX A
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APPENDIX B AIR DISPERSION MODELING OUTPUT DATA

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

			O 60 coliber Tracer M47 (M9)		Number of Rolinds (I):	-	1 round
		יסוונות אלי מיסט ממווני.	A574		Release duration (t):	2	2 seconds
	Z. Z.	Number of items tested =	100	3	Unit Concentration (UC):	1.636E-04	1.636E-04 (a/m³)/(a/s)
	Net Exp	Net Explosive Weight (lbs) =		3.21E-02			
	LV		150			Polobola operation	Dollutant
			Canada de la companya		Total Mass of Substance	Average Modeled	Foliutani
		Measured	Average Adjusted	10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	(orams/item)	One Item	for One Item
Compound	Measured Actual	Background	Emission Factor	Average Adjusted		(grams/m³)	(a/sec)
	(mg/m³)	Concentration (mg/m³)	(lb/item) EF	(Ib/Ib NEW)	Σ	CONC	ER ₁
Permanent Gases							
Ammonia (NH ₂)	2.03E+01	¥	2.20E-04	6.83E-03	9.96E-02	8.147E-06	4.98E-02
Carbon Dioxide (CO ₂)	5.27E+02	ΨN	5.69E-03	1.77E-01	2.58E+00	2.113E-04	1.29E+00
Carbon Monoxide (CO)	1.01E+03	ΑΝ	1.09E-02	3.40E-01	4.96E+00	4.059E-04	2.48E+00
Oxides of Nitrogen (NOx)	4.45E+01	NA	4.81E-04	1.50E-02	2.18E-01	1.784E-05	1.09E-01
Sulfur Dioxide (SO ₂)	2.62E-01	ΑN	2.83E-06	8.81E-05	1.29E-03	1.051E-07	6.43E-04
Acid Gases				,			
Hydrogen Fluoride	2.20E-01	2.20E-01	DN	Q	QN	Q	Q
Hydrogen Chloride	2.20E-01	2.10E-01	QN	Q	QN	2	2
Hydrogen Bromide	2.10E-01	2.10E-01	QN	QN	QN	9	2
Nitric Acid	2.10E-01	2.10E-01	QN	QN	QN	2	2
Phosphoric Acid	2.10E-01	2.10E-01	QN	QN	QN	2	Q
Sulfuric Acid	2.55E-01	2.10E-01	4.66E-06	1.45E-04	2.11E-03	1.728E-07	1.06E-03
Cyanide							
Particulate Cyanide	5.80E-01	1.20E-02	7.07E-06	2.20E-04	3.20E-03	2.622E-07	1.60E-03
Hydrogen Cyanide	7.22E+00	1.30E-02	8.78E-05	2.73E-03	3.98E-02	3.257E-06	1.99E-02
Particulates							
Total Suspended Particulate	3.39E+01	NA	4.12E-04	1.28E-02	1.87E-01	1.528E-05	9.34E-02
Particulate Matter <10 microns	3.11E+01	NA	3.78E-04	1.18 E- 02	1.71E-01	1.403E-05	8.57E-02
Particulate Matter <2.5 microns	1.81E+01	NA	2.20E-04	6.86E-03	1.00E-01	8.178E-06	5.00E-02
Metals						L	70 100
Aluminum	7.19E-02	4.30E-02	8.72E-07	2.71E-05	3.96E-04	3.236E-08	1.98E-04
Antimony	5.65E-01	4.30E-02	6.88E-06	2.14E-04	3.12E-03	2.551E-07	1.56E-03
Arsenic	1.05E-02	1.08E-02	Q	Q	QN	ON !!	
Barium	8.81E-01	4.30E-02	1.07E-05	3.34E-04	4.87E-03	3.985E-07	2.44E-U3
Beryllium	4.21E-02	4.30E-02	QN	ON	QN	Q	2
Cadmium	4.21E-02	4.30E-02	ND	QN	QN	QN	QN I
Calcium	4.62E-01	1.96E-01	3.50E-06	1.09E-04	1.59E-03	1.297E-07	7.93E-04

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Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

					Mumber of Dougle (I).	1	round
	Ö	Cartridge, 0.50 calibe	0.50 caliber, Iracer, M1/ (M2)		William of Noting		-
		DODIC	A571		Release duration (t):	7	seconds
	Numt	Number of items tested =		3	Unit Concentration (UC):	1.636E-04 (g/m³)/(g/s)	(a/m²)/(g/s)
	Net Exp	Net Explosive Weight (lbs) =		3.21E-02			
	W. C. C. C. S. A.T.C. Firing TestiResuitsing Table	* ATCFILING T	estiResuits		Total Mass of Substance	Average Modeled	Pollutant
		Measured	Average Adjusted		Emitted	Concentration for	Emission Rate for One Item
Compound	Measured Actual Concentration	Background	Emission Factor	Average Adjusted Emission Factor	(graffishein)	(grams/m³)	(c)
	(mg/m ₃)	(mg/m³)	EF (10)	(ib/ib NEW)	Z	CONC	ER,
men'd	4 21F-02	4.30E-02	QN	Q	QN	QN	QN
Coholi	4.21E-02	4.30E-02	QN	QN	QN	QN	Q
Consti	1.11E+01	9.55E-02	1.33E-04	4.15E-03	6.06E-02	4.953E-06	3.03E-02
l ead	1.15E+00	4.30E-02	1.39E-05	4.33E-04	6.31E-03	5.162E-07	3.16E-03
Magnesium	2.26E-01	4.30E-02	2.76E-06	8.58E-05	1.25E-03	1.023E-07	6.26E-U4
Manganese	4.21E-02	4.30E-02	QN	QN	ND	QN	2
Nickel	4.21E-02	4.30E-02	QN	ON	ΩN	Q	
Selenism	1.05E-02	1.08E-02	QN	QN	QN	Q !	2 2
Silver	4.21E-02	4.30E-02	QN	ON	QN	QN	2 :
Thallim	4.21E-02	4.30E-02	QN	QN	QN	QN	2
Vapadium	4.21E-02	4.30E-02	QN	ON	QN	Q	ON IS
Zinc	1.81E+00	4.30E-02	2.20E-05	6.84E-04	9.97E-03	8.159E-07	4.99E-U3
TO-11 Carbonyls						00000	100
Formaldehyde	2.46E-02	1.23E-01	2.98E-07	9.27E-06	1.35E-04	1.105E-U8	0.705-03
Acetaldehyde	1.80E-01	1.80E-01	QN	QN	QN	2	2 2
Acetone	1.19E+00	1.19E+00	Q	Q	QN	2 5	ON CA
Acrolein	2.29E-01	2.29E-01	Q	Q	QN	2 5	2 2
Proprionaldehyde	2.37E-01	2.37E-01	Q.	S	QN:	2 2	2 2
Crotonaldehyde	2.87E-01	2.87E-01	Q	Q.	ON C	2 2	2 2
Butyraldehyde	2.95E-01	2.95E-01	Q	2		2 2	2 2
Benzaldehyde	4.34E-01	4.34E-01	2	QN		2 2	
Isovaleraldehyde	3.52E-01	3.52E-01	Q	Q	OZ.	2 2	2 2
Valeraldehvde	3.52E-01	3.52E-01	QN	Q	ON.		2 2
o m.o-Tolualdehyde	4.91E-01	4.91E-01	QN	Q	QN		2
Hexaldehyde	4.10E-01	4.10E-01	QN	Q	QN	ON !	
2.5-Dimethylbenzaldehyde	4.10E-01	4.10E-01	QN	Q.	QN	QN	2
VOCs						00 11330 0	1 E2E 04
Propene	5.94E-02	3.44E-04	7.15E-07	2.23E-05	3.25E-04	2.0325-00	ויסבר-סד
Dichlorodiflouromethane	2.97E-03	3.46E-03	QV	Q	QN	ON.	2

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

					Number of Rounds (I):	-	1 round
	Ö	Cartridge, 0.50 callo	0.50 caliber, Iracer, MIT (MZ)		Description (1):	6	seconds
		DODIC	A571		Release dulation (v).	1 626 04	3111-1-1
	Num	Number of items tested =		3	Unit Concentration (UC):	1.650E-04 (g/m_)/(g/s	(g/m_)/(g/s)
	Net Explosive W	osive Weight (lbs) =	3.21E-02	E-02			
		A.	IC Elfing Test Results		Total Mass of Substance	Average Modeled	Pollutant
			potonipo occupa		Emitted	Concentration for	Emission Rate for One Item
Compound	Measured Actual Concentration	Background	Emission Factor	Average Adjusted Emission Factor	(grams/liem)	(grams/m³)	(ces/b)
	(mg/m³)	Concentration (mg/m³)	(iD/item) EF	(Ib/Ib NEW)	Σ	CONC	ER,
1	2 545 03	3 54F-03	QN	QN	QN	QN	Q
Chlorodifluoromethane	6.04E-03	6.99F-03	2	QN	ND	QN	Q
Freon 114	1 65E-03	1.45F-03	4.41E-09	1.37E-07	2.00E-06	1.636E-10	1.00E-06
Chloromethane	2.56E-03	2.56E-03	S	QN	QN	ON	Q.
Vinyl Chloride	4 33E-02	2.21E-03	1.61E-07	5.00E-06	7.29E-05	5.966E-09	3.65E-05
1,3-Butadiene	3.88E-03	3.88E-03	2	QN	QN	QN	2 4
Divinolifettialie	2 64F-03	2.64E-03	Q	Q	ON	ON	2 9
Cirplorellane	4.21E-03	4.21E-03	Q	QN	QN	QN	NO 2
Tichloroffouromethane	1.69E-03	1.69E-03	2.22E-09	6.91E-08	1.01E-06	8,239E-11	3.04E-07
	8.85E-04	2.95E-03	1.07E-08	3.34E-07	4.87E-06	3.986E-10	Z.44E-U0
rentane	2 29E-03	2.29E-03	Q	QN	QN		QN S
Acrolein	4 05F-03	4.05E-03	Q	QN	ND	2	2
1,1-Dichloremene	7 68E-03	7.68E-03	Q.	QN	QN	2	2 13
Freon 113	1 84F-01	1.07E-01	1.10E-06	3.41E-05	4.98E-04	4.072E-08	2.49E-04
Acetone	5.81E-03	5.81E-03	Q	DN	QN	9	2 5
Methyl louide	3.11E-03	3.11E-03	QN	QN	QN	QN I	ON 10, 0
Acetonitrile	9.82E-02	8.39E-03	1.10E-06	3.41E-05	4.97E-04	4.06/E-08	7.49E-04
3-Chloropropene	3.13E-03	3.13E-03	QN	9	ON LINE	1 A A S B = O B	2 72E-04
Methylene Chloride	1.39E-01	4.52E-02	1.20E-06	3.74E-U5	5.45E-04	GN GN	Q.
tert-Butyl Alcohol	3.03E-03	3.03E-03	ON IS	ND 7 SEE OS	1 075-04	8.765E-09	5.36E-05
Acrylonitrile	1.95E-02	2.17E-03	2.30E-U/	ND-30E-00	CN	Q	9
trans-1,2-Dichloroethene	3.96E-03	3.96E-03		2 2	CZ	Q	QN
Methyl t-Butyl Ether	3.61E-03	3.61E-03	2 2	2 2	CZ	S	QN
Hexane	9.52E-02	1.3/E-01	2 2	2 5	2	QN	QN
1,1-Dichloroethane	3.97E-03	3.975-03	2 2	2 2	QN	2	QN
Vinyl Acetate	3.52E-03	3.52E-03	2 2	2 5	CN	2	QN
cis-1,2-Dichloroethene	3.96E-03	3.96E-03	2 2	2 2	S	S.	Q
2-Butanone	2.95E-03	2.95E-03		90 170 7	7 80E-05	4 821E-09	2.95E-05
Ethyl Acetate	1.08E-02	3.60E-03	1.30E-07	4.04E-00	3.035-03		

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

					Mimber of Rounds (I)	-	1 round
	Ö	Cartridge, 0.50 calibe	0.50 caliber, Iracer, M17 (M2)		Chinosi io iognino	c	pagade
		DODIC	A571		Release duration (t):	70 1000 1	Secolius
	Numb	Number of items tested =	3		Unit Concentration (UC):	1.636E-04 (g/m²)/(g/s)	(a/m²)/(g/s)
	Net Expl	Net Explosive Weight (lbs) =	3.21E-02	E-02			
	IV-		CHITING FIRST Results Comment		Total Mass of Substance	Average Modeled	Pollutant
					Emitted	Concentration for	Emission Rate
	Cuto A bounded	Measured	Average Adjusted	Average Adjusted	(grams/item)	One Item	for One Item
Compound	Concentration	Background	Emission Factor	Emission Factor		(grams/m³)	(ces/b)
	(mg/m ₃)	Concentration (mg/m³)	(Ib/item) EF	(Ib/Ib NEW)	Σ	CONC	ER,
							2
Machal Appoint	3.52E-03	3.52E-03	QN	QN	QN	ON.	2 4
Melliyi Adiylate	4.88E-03	4.88E-03	Q.	QN	QN	QN	
A A Habitathan	3 R2F-03	3.82E-03	4.91E-09	1.53E-07	2.23E-06	1.820E-10	1.11E-00
1, 1, 1-1 ficinoroeurane	6.29E-03	6.29E-03	QN	2	QN	Q	Q
Carbon letrachioride	8.07E.03	4 05E-03	7.34E-08	2.28E-06	3.33E-05	2.725E-09	1.67E-05
1,2-Dichlorethane	3 125-03	9 59F-04	3.76E-06	1.17E-04	1.71E-03	1.396E-07	8.53E-04
Benzene	3.12E-01	4 67E-03	CN	2	QN	QN	Q
Isooctane	4.07 11-03	2 46E-03	CN	2	QN	QN	Q
Heptane	4.105-03	7 88E-03	CZ	2	QN	QN	QN
Trichloroethane	4.000-03	4.00E-03	S	2	QN	QN	Q
Ethyl Acrylate	4.09E-03	4 62E-03	S	QN	QN	QN	QN
1,2-Dichloropropane	4.02E-03	4.041-03	2	CN	QN	Q	Q
Methyl Methacrylate	4.09E-03	4.096-03	2 2	Ę	QN	Q	QN
Dibromomethane	7.11E-03	7.115-03	2 2	S	QN	Q	ON
1,4-Dioxane	3.60E-03	3.50E-03	2 2	S CX	QN	Q	QN
Bromodichloromethane	6.70E-03	6.70E-03	2 2		QX	Q	Q
4-Methyl-2-Pentanone	4.10E-03	4.105-03	1 26F 07	1 33E-05	1.93E-04	1.581E-08	9.66E-05
Toluene	3.58E-02	7.345-04	4.20E-07	CN CN	QN	S	QN
Octane	4.6/E-03	4.076-03	2 2	Q	QN	QN	ON
trans-1,3-Dichloropropene	4.345-03	4.34E-03	CN	Q	ON	QN	QN
Ethyl Methacrylate	4.07 = 0.0	5.46E-03	S	9	QN	QN	Q
1,1,2-Trichloroethane	2.40E-03	6.78E-03	S	2	QN	QN	Q
Tertrachloroethene	0.70E-03	4 10E-03	QV	2	QN	QN	Q
2-Hexanone	4.101-03	9 57E-03	S	QX	QN	Q	QN
Dibromochloromethane	0.52E-03	0.02E-00	9	S	QN	Q	Q
1,2-Dibromoethane	7.585-03	1.00E-03	2 2	S	QN	Q	QN
Chlorobenzene	4.60E-03	4.00E-03	2 2	2 2	QN	2	QN
1,1,1,2-Tetrachloroethane	6.87E-03	6.8/E-03	ND 242E 08	1 06E-06	1.55E-05	1.268E-09	7.75E-06
Ethylbenzene	2.82E-03	4.34E-03	3.425-00	2015-06	2 93E-05	2.400E-09	1.47E-05
m/p-Xylene	6.51E-03	1.305-03	0.475-00	4.01-00	22		

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

					W. Special Constitution	•	1 Iround
	<u>ت</u>	Cartridge, 0.50 calibe	0.50 caliber, Tracer, M17 (M2)		Number of Nouries (1).		op de
		DODIC	A571		Release duration (t):	7 696 7	Z Seconds
	Num	Number of items tested =		3	Unit Concentration (UC):	1.030E-04	1.030E-04 (g/m²)/(g/s)
	Net Explosive We	osive Weight (lbs) =		3.21E-02			
		ATICHERING TOST RESUITS AND	est Results 14		Total Mass of Substance	Average Modeled	Pollutant
		Measured	Average Adjusted		Emitted (grams/item)	Concentration for One Item	for One Item
Compound	Measured Actual Concentration	Background	Emission Factor	₹ ш		(grams/m³)	(bec)
	(mg/m ₃)	Concentration (mg/m³)	(ID/Item)	(ib/ib NEW)	Σ	CONC	ER,
	1.0	4 245 02	5 27E-08	1.64E-06	2.39E-05	1.955E-09	1.19E-05
o-Xylene	4.34E-03	4.046-03	1 20E-07	4.01E-06	5.85E-05	4.786E-09	2.93E-05
Styrene	1.07E-02	4,20E-U3	ND ON	QV	QN	QN	9
Bromoform	1.03E-02	1.03E-02	2 5	CN	QN	Q	Q
Cumene	4.92E-03	4.9ZE-03	2 2	QN	QN	QN	QN
1,1,2,2-Tetrachlorethane	6.87E-U3	0.07 ==-0.3	9 5	QN	QN	QN	2
1,2,3-Trichloropropane	6.03E-03	0.03E-03	2 2	GN	Q	QN	Q
Bromobenzene	6.42E-03	0.42E-03 4 02E-03	2 2	Q	QN	QN	2
4-Ethyltoluene	4.92E-03	A 02E-03	S	2	QN	Q	2
1,3,5-Trimethylbenzene	4.9ZE-U3	4.32L-03	GN	2	QN	QN	2
Alpha Methyl Styrene	4.035-03	4.001	1 18F-08	3.68E-07	5.36E-06	4.384E-10	2.68E-06
1,2,4-Trimethylbenzene	9.036-04	A 01E-03	QV	2	QN	Q	Q !
1,3-Dichlorobenzene	0.0	8.04E-03	S	Q	QN	Q	ON.
1,4-Dichlorobenzene	7.495.03	5 185-03	S	<u>Q</u>	QN	Q	QN.
Benzyl Chloride	5.18E-U3	S.10E-03	Q.	S	QN	QN	QN !
1,2-Dichlorobenzene	6.016-03	0.015-03	2	2	QN	2	<u>Q</u>
Hexachlorethane	9.08E-03	7.42F-03	2	Q	QV	Q	Q S
1,2,4-Trichlorobenzene	1 07E-02	1.07E-02	Q	Q	QN	QN	2
Hexachlorobutagiene Hexachlorobutagiene Hexachlorobutagiene Hexachlorobutagiene Hexachlorobutagiene	ounds (TICs)						
Undrocarbone	_				3	4 40EE 08	8 59F-03
Il yal ocal Bolls	4.10E+00	1.10E+00	3.79E-05	1.18E-03	1.72=-02	1.400 C	5.52F-04
IMEUIAITE	2.00E-01	2.29E-02	2.43E-06	7.57E-05	1.10E-03	9.024E-00	7.54F-05
Eulyleile	2.74E-02	2.13E-02	3.32E-07	1.03E-05	1.51E-04	1.434E-00	3 12E-04
Acetylene	1.13E-01	2.46E-02	1.37E-06	4.27E-05	6.23E-04	D.088E-00	3.12E-04
Ethane	5 42E-02	3.44E-02	6.59E-07	2.05E-05	2.99E-04	2.444E-U0	1.436-04
Propylene	20.121.02	3.61F-02	2	S	QN	2	
Propane	3.015-02	3 20 - 30	S	2	QN	9	Q
Propyne	3.20E-02	3.205-02	2 2	QN	QN	QN	2
Isobutane	4.75E-02	4.735-02	2 5	GN	QN	QN	9
1-Butene/Isobutylene	9.18E-02	9.18E-02	2				

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

		Cartridge 0.50 caliber.	r. Tracer. M17 (M2)		Number of Rounds (I):	1	1 round
			A571		Release duration (t):	2	2 seconds
	Num	Number of items tested =	L		Unit Concentration (UC):	1.636E-04	1.636E-04 (g/m³)/(g/s)
	Net Exp	Net Explosive Weight (lbs) =	3.21E-02	E-02			
	JLV _A , L. S.	ATC FILINGIL	Filing Test Results		Total Mass of Substance	Average Modeled	Pollutant
	THE COMMENT OF THE CO	Carlotte Company Compa			Emitted	Concentration for	Emission Rate
	Moseured Actual	Measured	Average Adjusted	Average Adjusted	(grams/item)	One Item	for One Item
Compound	Concentration	Background	Emission Factor	Emission Factor		(grams/m³)	(d/sec)
	(mg/m ₃)	(mg/m³)	(io/iten.) EF	(ib/ib NEW)	Σ	CONC	ER,
1 3-Butadiene/hutane	4.59E-02	4.59E-02	Q	<u>Q</u>	QN	QN	QN
o's-buttene	4.59E-02	4.59E-02	QN	QN	QN	QN	Q
1-Butyne	4.59E-02	4.59E-02	Q	QN	QN	QN	Ω
trans-Butene	4.59E-02	4.59E-02	Q	QN	ND	QN	Q
2-Butyne	4.42E-02	4.42E-02	QN	QN	ND	QN	QN
n-Pentane	5.90E-02	5.90E-02	QN	QN	QN	QN	QN .
n-Hexane	1.99E-01	7.05E-02	2.41E-06	7.50E-05	1.09E-03	8.947E-08	5.47E-04
SVOCs							
N-nitrosodimethylamine	1.81E-02	1.83E-02	ND	Q.	QN	QN !	
Bis(2-chloroethyl)ether	1.81E-02	1.83E-02	QN	2	ND	Q	ON.
Phenol	1.81E-02	1.83E-02	ND	2	QN	Q	QN S
2-chlorophenol	1.81E-02	1.83E-02	ND	Q	QN	Q	
1,3-dichlorobenzene	1.81E-02	1.83E-02	ND	Q.	QN	2	2
1,4-dichlorobenzene	1.81E-02	1.83E-02	ND	QN	QN	2	Q !
1.2-dichlorobenzene	1.81E-02	1.83E-02	ND	QN	QN	2	Q.
Benzyl alcohol	1.81E-02	1.83E-02	QN	ON	QN	Q	Q S
Bis(2-chloroisopropyl)ether	1.81E-02	1.83E-02	ND	QN	QN		2 5
2-methylphenol	1.81E-02	1.83E-02	Q.	Q	QN	QN S	2 2
Hexachloroethane	1.81E-02	1.83E-02	Q.	QN	QN		2 2
N-nitroso-di-n-propylamine	1.81E-02	1.83E-02	Q.	2	QN		Q S
4-methylphenol	1.81E-02	1.83E-02	QN	QN	QN	ON:	2
Nitrobenzene	1.81E-02	1.83E-02	QN	QN	QN	QN :	Q S
Isophorone	1.81E-02	1.83E-02	QN	QN	QN	QN.	2
2-nitrophenol	1.81E-02	1.83E-02	QN	QN	QN	QN S	2 9
2,4-dimethylphenol	1.81E-02	1.83E-02	Q	Q	QN	ON!	
Bis(2-chloroethoxy)methane	1.81E-02	1.83E-02	QN	QN	QN	QN	ON.
2,4-dichlorophenol	1.81E-02	1.83E-02	QN	Q	QN	Q !	2 2
1.2.4-trichlorobenzene	1.81E-02	1.83E-02	QN	Q	QN	Q	ON.
Naphthalene	1.79E-02	1.83E-02	2.17E-07	6.76E-06	9.86E-05	8.068E-09	4.93E-05

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

		- 1			Number of Rounds (I):	1	round
	Ö	Cartridge, 0.50 calibe	0.50 caliber, Iracer, M1/ (M2)		יאלי בייוים בייוים בייוים איני	6	spronds
		DODIC	A571		Release duration (t):	70 2369 7	Seconds
	Numit	Number of items tested =		3,	Unit Concentration (UC):	1.636E-04 (g/m²)/(g/s	(g/m²)/(g/s)
	Net Explosive W	osive Weight (lbs) =	3.21E-02	5-02			
	V		sst Results! - Just 1		Total Mass of Substance	Average Modeled	Pollutant
			7		Emitted	Concentration for	Emission Rate
panoamo	Measured Actual	Measured Background	Average Adjusted Emission Factor	Average Adjusted	(grams/item)	(grams/m³)	(bes/6)
	Concentration	Concentration	(lb/item)	(Ib/Ib NEW)		O N	ä
) 	(mg/m²)	<u>.</u>		M	CONC	
	4 845 02	1 R3F-02	QN	QN	QN	Q.	2
4-chloroaniline	1.015-02	1 83F-02	Q	Q	QN	QN	9
Hexachlorobutadiene	1.015-02	1 83E-02	Q	2	QN	ON	Q
4-chloro-3-methylphenol	1 845 02	1 83F-02	QN	Q	QN	QN	9
2-methylnaphthalene	1.015-02	1 R3F-02	2	2	QN	QN	QN
Hexachlorocyclopentadiene	1.815-02	1.83E-02	Q	QN	QN	QQ	QN .
2,4,6-trichlorophenol	10 TE 02	1 R3E-02	Q	S	QN	Q	Q I
2,4,5-trichlorophenol	1 815-02	1.83E-02	2	QN	QN	Q	2 5
2-chloronaphthalene	1 84E-02	1 83F-02	2	QN	QN	Q	
2-nitroaniline	1 845-02	1.83E-02	Q.	QN	ND	Q	
Acenaphthylene	1,011-02	1 83E-02	2	Q	QN	2	Q
Dimethylphthalate	1.01E-02	1 83F-02	Q	Q	QN	Q	Q
2,6-dinitrotoluene	1.015-02	1,03E 02 1 83E-02	Q	2	QN	Q	2
Acenaphthene	1.01E-02	3 67F-02	Q	Q	QN	Q	Q
3-nitroaniline	3.025-02	3 67F-02	Q	Q	QN	Q	Q
2,4-dinitrophenol	3.02E-02 1 84E-02	1 83F-02	Q	2	QN	Q	Q.
Dibenzofuran	1 815-02	1.83E-02	Q	Ð	ND	Q	2 5
2,4-dinitrotoluene	3 625-02	3 67E-02	2	2	ON	QN	2
4-nitrophenol	1 84E-02	1 83E-02	2	2	QN	Q	2
Fluorene	1 81E-02	1.83E-02	Q	QN	QN	Q	
4-chiorophenyl-phenyleulei	1 R1E-02	1.83E-02	2	QN	ON	2	
Dietnylphrhalare	3 62F-02	3.67E-02	9	QN	QN	Q !	2 2
4-nitroaniine	3 62F-02	3.67E-02	æ	QN	QN	2	
4,6-dinitro-z-metriyipiteriol	1 81E-02	1.83E-02	2	QN	QN	2	2 !
N-nitrosodipnenylamine(1)	4 84E-02	1 83F-02	₽	9	ND	Q	2
4-bromophenyl-phenyletinel	1 84 1 02	1 R3F-02	2	Q	QN	2	ON!
Hexachiorobenzene	1.01E-02	20 202 02	S	2	QN	2	Q
Pentachiorophenol	3.02E-02	3.07 E-02	2 2	9	QN	QN	Q
Phenanthrene	1.81E-02	1.035-02	2 2	2	QN	QN	Q
Anthracene	1.81E-02	1.03E-02					

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

			7.44 TANK		Mumber of Rounds (I)		1 round
	3	Carridge, 0.50 cailber, 11acer, 1017 (1014)	er, tracer, mit (ind		(A) Composition in the compositi		
		DODIC:	A571		Release duration (t):	7	seconds
	Numit	Number of items tested =		3	Unit Concentration (UC):	1.636E-04	I.636E-04 (g/m³)/(g/s)
	Net Explosive W	losive Weight (lbs) =	3.21	3.21E-02			
	A STATE OF THE STA	ATO'FIRINGE	Greifingfrest Results 14 14 14 14	The state of the s	Total Mass of Substance	Average Modeled	Pollutant
		Measured	Average Adjusted		Emitted	Concentration for One Item	Emission Rate for One Item
Compound	Measured Actual Concentration	Background	Emission Factor	Average Adjusted Emission Factor	(grants/rein)	(grams/m³)	(bes/b)
	(mg/m ₃)	(mg/m ₃)	(ID)(IG)(I)	(Ib/Ib NEW)	Σ	CONC	ER,
O n butdokthalate	1.81E-02	1.83E-02	Q	Q	QN	QN	QN
Distriction	1.81E-02	1.83E-02	QN	QN	ON	Q	Q
Pyrene	1.81E-02	1.83E-02	QN	QN	ND	Q	Q
Butylbenzylphthalate	1.81E-02	1.83E-02	QN	QN	QN	Q	Q !
Renzo(a)anthracene	1.81E-02	1.83E-02	QN	QN	ND	2	ON !
Chrysene	1.81E-02	1.83E-02	QN	QN	ON	QN	2
3.3-dichlorobenzidine	1.81E-02	1.83E-02	QN	Q	QN	ON	ON 200
Bis(2-ethylhexyl)phthalate	9.11E-01	2.02E-01	8.94E-06	2.78E-04	4.06E-03	3.318E-07	2.03E-03
Di-n-octylphthalate	1.81E-02	1.83E-02	QN	QN	QN	ON.	2 2
Benzo(b)fluoranthene	1.81E-02	1.83E-02	QN	QN	QN	Q !:	2
Benzo(k)fluoranthene	1.81E-02	1.83E-02	QN	Q	QN	ON !	2 2
Benzo(a)pvrene	1.81E-02	1.83E-02	QN	Q	QN	QN	Q S
Indeno(1,2,3-cd)pvrene	1.81E-02	1.83E-02	QN	QN	QN	Q	2 2
Dibenz(a.h)anthracene	1.81E-02	1.83E-02	QN	Q	QN	ON !	2 5
Benzo(a,h.i)perylene	1.81E-02	1.83E-02	QN	ΩN	QN	QQ	Q.
SVOC Tentatively Identified Compounds (TICs)	pounds (TICs)						
TO-13 (PAHs)						20 1	20 700 6
Naphthalene	1.61E-02	5.50E-03	1.36E-07	4.23E-06	6.17E-05	5.044E-09	3.00E-03
Acenaphthylene	7.87E-04	1.83E-05	9.55E-09	2.97E-07	4.33E-Ub	3.3436-10	2.17E-03
Acenaphthene	1.35E-04	4.77E-05	1.12E-09	3.485-06	3.00E-07	1.13/2-11	9.02E-07
Fluorene	3.62E-04	3.85E-U5	3.900-09	0.08E.08	1 46E-06	1.191E-10	7,28E-07
Phenanthrene	3.35E-04	7.00E-03	3.21E-03	1 67E-08	2 44E-07	1.995E-11	1.22E-07
Anthracene	4.455-03	1.03E-03	0.30C	1 26E-07	1 84E-06	1.504E-10	9.19E-07
Fluoranthene	3.35E-04	1.03E-03	4.03E-03	1 815-07	2 64E-06	2.156E-10	1.32E-06
Pyrene	4.80E-04	1.03 1-03	0.015-03	0.27E-08	1.35E-06	1.105E-10	6.76E-07
Benzo(a)anthracene	2.47E-04	1.83E-05	2 021 00	9.27 E-00	1 30E-06	1.138E-10	6.96E-07
Chrysene	2.54E-04	1.83E-05	3.07=09	9.34E-00	2 19E-05	1.790E-10	1.09E-06
Benzo(b)fluoranthene	3.98E-04	1.83E-05	4.82E-09	1.305-07	1.0E-00	1 045F-10	6.39E-07
Benzo(k)fluoranthene	2.33E-04	1.83E-05	Z.82E-09	0.705-00	00-103:1		

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

			T		Number of Rounds (1):	-	round
	3	Cartridge, U.SU callo	# I		Deleges duration (*):	6	seconds
		DODIC	A571		Kelease duration (t):	4 R3RE 04	3///01/01
	Numit	Number of items tested =		3	Unit Concentration (UC):	1.030E-04 (g/m_)/(g/s)	(d/m_)/(d/s)
	Net Explosive W	osive Weight (lbs) =		3.21E-02			
	V see the second	ATC Firing T	C Firing TestiResults 🚩 🛸		Total Mass of Substance	Average Modeled	Pollutant
		Measured	Average Adjusted	7	Emitted (crams/item)	Concentration for One Item	Emission Kate for One Item
Compound	Measured Actual Concentration	Background	Emission Factor	Average Adjusted Emission Factor		(grams/m³)	(a/sec)
	(mg/m ₃)	Concentration (mg/m³)	(io/item)	(Ib/Ib NEW)	Σ	CONC	ER,
	70 100 7	4 025.05	5 82E-09	1.81E-07	2.64E-06	2.158E-10	1.32E-06
Benzo(e)pyrene	4.80E-04	1.83E-05	4.17E-09	1.30E-07	1.89E-06	1.547E-10	9.46E-07
Benzo(a)pyrene	3.44E-04	1 83E-05	4.50E-09	1.40E-07	2.04E-06	1.669E-10	1.02E-06
Indeno(1,2,3-ca)pyrene	4 17E-05	1 83E-05	5.04E-10	1.57E-08	2.29E-07	1.871E-11	1.14E-0/
Dibenz(a,n)anthracene	7.05F-04	1.83E-05	8.56E-09	2.66E-07	3.88E-06	3.177E-10	1.94E-06
Benzo(g,n,n)perylene						9	2
DIOAIIIS alid I dialio	3.75F-09	3.61E-09	Q	QN	QN	ממ	2 5
2376-1 etracinologiperizo-p-dioxin	3.59E-09	3.40E-09	QN	QN	Q	ON S	2 2
402479 Heyzehlorodibenzo-n-dioxin	4.38E-09	4.20E-09	QN	QV	QN		2 2
12347 O-HEXACIIIO OGIDENZO P. COMINA 402679 Hovooblorodibenzo-n-dioxin	4.53E-09	4.25E-09	QN	Q	QN	Q S	2 2
422790 Havachlorodibenzo-n-dioxin	7.24E-09	6.88E-09	QN	QN	QN	ON LOCAL	100 DEFEE 41
123/09-nexaciliological process	1 40F-08	5.35E-09	1.12E-13	3.49E-12	5.09E-11	4.166E-13	7.335-11
1234678-Heptachlorodipenzo-p-dioxili	2.14E-07	6.58E-08	1.89E-12	5.88E-11	8.58E-10	7.016E-14	4.29E-10
OCUD Const H. Line Line dibones of firms	3.84E-09	3.61E-09	₽	QN	QN	2	2 2
2378-1 etrachiorotiberizo-p-turan	3.80E-09	3.65E-09	Q	QN	QN	2	S
123/ o-remacino odioenzo princio	2.33E-09	2.16E-09	QN	QN	QN	2 9	2 2
433478- Hevachlorodihenzo-p-furan	3.17E-09	2.97E-09	QN	Q	QV.		2 2
123678-Hexachlorodibenzo-p-furan	3.31E-09	3.02E-09	Q	Q		S	S
123789-Hexachlorodibenzo-p-furan	2.87E-09	2.70E-09	2	2		2 5	GN
234678-Hexachlorodibenzo-p-furan	2.27E-09	2.13E-09	Q	ON I	ND 4 52E 44	1 253F-15	7.66E-12
1234678-Hentachlorodibenzo-p-furan	2.79E-09	1.94E-09	3.38E-14	1.05E-12	1.5365.1	CN	S
1234789-Heptachlorodibenzo-p-furan	5.78E-09	5.62E-09	Q	ON S	ND	4 293F-15	2.62E-11
OCDF	9.51E-09	5.10E-09	1.16E-13	3.60E-12	3.43E-11	21 - 100711	
Energetics				G.	CIN	QN	Q
Nitrobenzene	3.51E-03	¥	2	2 2	CZ	9	2
2-Nitrotoluene	3.51E-03	ΨŽ	Q.			GN	S
3-Nitrotoluene	3.51E-03	ΑN	2	2 2	2	2	Q
4-Nitrotoluene	3.51E-03	Ϋ́	Q			S	9
Nitroalycerine	3.51E-03	ΑN	Q	2	CN		

Table B-1: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 100 meter location

		Carridge 0.50 caliber Tracer M17 (M2)	r. Tracer, M17 (M2)		Number of Rounds (I):	1	round
		DODIC:	A571		Release duration (t):	2	2 seconds
	MnN	Number of items tested =		3	Unit Concentration (UC):	1.636E-04	1.636E-04 (g/m³)/(g/s)
	Net Exp	Net Explosive Weight (Ibs) =	3.21	3.21E-02			
	A. A.	*ATCEINING TO	CEiring Test Results 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Total Mass of Substance	Average Modeled	Pollutant
					Emitted	Concentration for	Emission Rate
	Moseurod Actual	Measured	Average Adjusted	Average Adjusted	(grams/item)	One Item	for One Item
Compound	Concentration	Background	Emission Factor	Emission Factor		(grams/m³)	(ces/b)
	(mg/m ₃)	Concentration (mg/m³)	(ID/II(em) EF	(Ib/Ib NEW)	Σ	CONC	ER,
	17.10	47	CIN	CZ	QN	QN	QN
1,3-Dinitrobenzene	3.51E-03	1	2 4		CN	CN	S
2.6-Dinitrotoluene	3.51E-03	NA	S				Ş
2 4-Dinitrotoluene	3.51E-03	NA	2	Q	QN		2 5
1.3 E. Trinitrohenzene	3.51E-03	ΑN	QN	QN	ON	QN	Q
7.4.6 Trinitrotolilone	3.51E-03	Ϋ́	S	QN	QN	QN	Q
Z'+'o-TimingCongile	3 51E-03	AN	QN	Q	Q	Q	Q
KUX	3.51E-03	AN	QN	QN	QN	QN	QN
4-Allillo-2,0-Dillillotouelle	3.51E-03	¥.	S	QN	ND	QN	QN
Total	3.51E-03	¥	QN	Q	ND	QN	Q
Tenyi Tayo	7 01E-03	Ϋ́Z	Q	2	ON	Q	Q
NIMIN To the state of the state	7 01E-03	AN	9	Q	ON	QN	QN
Pentaeryunioneu annu are	1 755-01	ΑN	Q	Ð	QN	QN	Q
Dibutyi primalate	יייייייייייייייייייייייייייייייייייייי	2	CN CN	CZ	QX	Q	QN
Dioctyl phthalate	1./3E-01	٢.	٩		CIV	CN	Q
Diphenylamine	8.77E-02	NA	ON.	ON	QV.		

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emission Study)
NA = Not Applicable
ND = Not Detected Footnotes:

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

			(Cat) 2774		Number of Rounds (I):		1 round
	Ö	Cartridge, 0.50 calibe	0.50 caliber, Iracer, M17 (M2)		College of the second		operator.
		DODIC	A571		Release duration (t):	7	3 seconds
	Numb	Number of items tested =		3	Unit Concentration (UC):	6.870E-05	6.870E-05 (g/m³)/(g/s)
	Net Exp	Net Explosive Weight (lbs) =		3.21E-02			
		**************************************	100		Total Mass of Substance	Average Modeled	Pollutant
	Š		1		Emitted	Concentration for	Emission Rate
	Measured Actual	Measured	Average Adjusted	Average Adjusted	(grams/item)	One Item	for One Item
Compound	Concentration	Concentration	(lb/item)	Emission Factor		(લાલાાર/ામ)	(2)
	(mg/m²)	(mg/m ₃)	Ш	(ויסוים)	Σ	CONC	ER,
Democratter Const							30
reillalleill Gases	2 03F+01	AN	2.20E-04	6.83E-03	9.96E-02	2.281E-06	3.32E-02
Ammonia (NH ₃)	5.22E+02	AN	5.69E-03	1.77E-01	2.58E+00	5.915E-05	8.61E-01
Carbon Dioxide (CO ₂)	1 01E+03	AN	1.09E-02	3.40E-01	4.96E+00	1.136E-04	1.65E+00
Carbon Monoxide (CU)	A A5E+01	AN	4.81E-04	1.50E-02	2.18E-01	4.996E-06	7.27E-02
Oxides of Nitrogeri (NOX)	2 R2E-01	AN	2.83E-06	8.81E-05	1.29E-03	2.944E-08	4.28E-04
Sulfur Dioxide (SO ₂)	2.02.2						
Acid Gases	2 200 01	2 20E-01	Q	Q	QN	QN	Q
Hydrogen Fluoride	2.205-01	2.20E-01	QN	2	QN	QN	Q
Hydrogen Chloride	2.20E-01	2 405 04	CN	S	QN	2	Q
Hydrogen Bromide	2.10E-01	2.10=-01	2 2	CN	QN	QN	QN
Nitric Acid	Z.10E-01	2.10E-01	2 2	Ş	QN	9	ND
Phosphoric Acid	2.10E-01	2.10E-01	A REE OR	1 45F-04	2.11E-03	4.836E-08	7.04E-04
Sulfuric Acid	2.55E-01	Z.10E-01	4.00E-00	10-101-1			
Cyanide				1000	3 20E-03	7 339E-08	1.07E-03
Particulate Cyanide	5.80E-01	1.20E-02	7.07E-06	2.20E-04	3.08E 03	9 119F-07	1.33E-02
Hydrogen Cyanide	7.22E+00	1.30E-02	8.78E-05	2.73⊏-03	3.30E-02		
Particulates				20 100 1	4 87E-04	4 277E-06	6.23E-02
Total Suspended Particulate	3.39E+01	ΨN	4.12E-04	1.285-02	1 71 11 01	3 927F-06	5.72E-02
Particulate Matter <10 microns	3.11E+01	ΨN	3.78E-04	1.185-02	1 000-01	2 289E-06	3.33E-02
Particulate Matter <2.5 microns	1.81E+01	¥	2.20E-04	0.00E-03	0.1		
Metals				10 L	2 ORE -04	9 N60F-09	1.32E-04
Aluminum	7.19E-02	4.30E-02	8.72E-07	2.115-03	0.301-03	7 142E-08	1.04E-03
Antimony	5.65E-01	4.30E-02	6.88E-06	2.14E-04	3.12E-03	CN	2
Arsenic	1.05E-02	1.08E-02	Q	2	ON LEG !	4 4465 07	1 62F-03
Barlim	8.81E-01	4.30E-02	1.07E-05	3.34E-04	4.87E-03	1.1105-07	OZE - OZE
Dendling	4.21E-02	4.30E-02	QN	Q	QN		2 2
Sodmins	4.21E-02	4.30E-02	QN	QN	QN	ON S	ON 200
Cadmun	4.62E-01	1.96E-01	3.50E-06	1.09E-04	1.59E-03	3.631E-08	5.28E-U4
Calcum							

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

			(014) 2714		Missipar of Damed		1 201104
	٥	Cartridge, 0.50 calibe	0.50 caliber, Iracer, M17 (MZ)		Malinder of Nourius (1).		Dillo
		DODIC	A571		Release duration (t):	3	3 seconds
	Numl	Number of items tested =		3	Unit Concentration (UC):	6.870E-05 (g/m³)/(g/s)	(g/m³)/(g/s)
	Net Exp	Net Explosive Weight (lbs) =	3.21	3.21E-02			
		A A TO FIND THE SUISE OF THE STATE OF THE ST	sidResults .		Total Mass of Substance	Average Modeled	Pollutant
Compound	Measured Actual	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Item (grams/m³)	Emission Rate for One Item (g/sec)
	(mg/m³)	Concentration (mg/m³)	(lb/item) EF	(Ib/Ib NEW)	M	CONC	ER,
Chromium	4.21E-02	4.30E-02	QN	QN	QN	QN	Q
Cobalt	4.21E-02	4.30E-02	QN	QN	ON	QN	ΩN
Copper	1.11E+01	9.55E-02	1.33E-04	4.15E-03	6.06E-02	1.387E-06	2.02E-02
Lead	1.15E+00	4.30E-02	1.39E-05	4.33E-04	6.31E-03	1.445E-07	2.10E-03
Magnesium	2.26E-01	4.30E-02	2.76E-06	8.58E-05	1.25E-03	2.865E-08	4.17E-04
Manganese	4.21E-02	4.30E-02	ON	QN	QN	QN	Q
Nickel	4.21E-02	4.30E-02	QN	Q	QN	Ω	QN !!
Selenium	1.05E-02	1.08E-02	QN	2	QN	Q	Q.
Silver	4.21E-02	4.30E-02	QN	Q	QN	Q	Q.
Thallium	4.21E-02	4.30E-02	ND	ND	ON	Q	2
Vanadium	4.21E-02	4.30E-02	QN	Q	ΩN	Q	Q
Zinc	1.81E+00	4.30E-02	2.20E-05	6.84E-04	9.97E-03	2.284E-07	3.32E-03
TO-11 Carbonyls							10
Formaldehyde	2.46E-02	1.23E-01	2.98E-07	9.27E-06	1.35E-04	3.096E-09	4.51E-05
Acetaldehyde	1.80E-01	1.80E-01	Q	Q	QN	ON	Q.
Acetone	1.19E+00	1.19E+00	ND	Q	QN	2	<u>Q</u>
Acrolein	2.29E-01	2.29E-01	Q	Q	QN	Q !	2
Proprionaldehyde	2.37E-01	2.37E-01	9	2	QN		ON S
Crotonaldehyde	2.87E-01	2.87E-01	Q	Q	QN		2 5
Butyraldehyde	2.95E-01	2.95E-01	2	2	QN		2 2
Benzaldehyde	4.34E-01	4.34E-01	Q	QN	QN	2	
Isovaleraldehyde	3.52E-01	3.52E-01	QN	QN	QN	2	
Valeraldehyde	3.52E-01	3.52E-01	Q	QN	QN	QN	Q !
o,m,p-Tolualdehyde	4.91E-01	4.91E-01	ND	ON	QN	Q	Q.
Hexaldehyde	4.10E-01	4.10E-01	ND	QN	QN	QN	ON I
2,5-Dimethylbenzaldehyde	4.10E-01	4.10E-01	QN	QV	QN	Q.	QN
VOCs						20 1707	7000 7
Propene	5.94E-02	3.44E-04	7.15E-07	2.23E-05	3.25E-04	7.431E-09	1.08E-04
Dichlorodiflouromethane	2.97E-03	3.46E-03	QN	Q	ON	ON	2

B-13

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

					Mumber of Bounds (I)		round
	5	Cartridge, 0.50 calibe	0.50 callber, Iracer, MT/ (IMZ)		Company of the Company (A)	6	spronds
		DODIC	A571		Kelease duration (t):	יי דיייייייייייייייייייייייייייייייייי	Seconds
	MuM	Number of items tested =		3	Unit Concentration (UC):	6.870E-U2 (g/m²)/(g/s)	(g/m²)/(g/s)
	Net Exp	Net Explosive Weight (lbs) =		3.21E-02			
		ATTO FILLING TE	CElring Test Results 45		Total Mass of Substance	Average Modeled	Pollutant
			10 de		Emitted	Concentration for	Emission Rate
Compound	Measured Actual	Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	(grams/item)	One nem (grams/m³)	(a/sec)
	(mg/m³)	Concentration (mg/m³)	(ID/Item) EF	(ib/ib NEW)	Σ	CONC	ER₁
	2 545 02	3 54F-03	S	QN	QN	QN	QN
Chlorodifluoromethane	8.04E-03	6 99F-03	Q	QN	QN	QN	Q
Freon 114	1 65E-03	1 45F-03	4.41E-09	1.37E-07	2.00E-06	4.581E-11	6.67E-07
Chlorometrane	2.56E-03	2.56E-03	QN	QN	QN	QN	QN
Vinyi Cinoride	1 33F-02	2.21E-03	1.61E-07	5.00E-06	7.29E-05	1.670E-09	2.43E-05
L,3-Butadierie	3.88E-03	3.88E-03	QN	QN	ND	QQ	
Digitaliane	2 64E-03	2.64E-03	Q	QN	ND	Q	ON.
Chorogenalie	4.21E-03	4.21E-03	QN	QN	ND	QN	ON FO TOO
Tricklosofor romothana	1.69E-03	1.69E-03	2.22E-09	6.91E-08	1.01E-06	2.307E-11	3.36E-07
Planton On On Serial Se	8.85E-04	2.95E-03	1.07E-08	3.34E-07	4.87E-06	1.116E-10	1.62E-06
Pentalie	2.29E-03	2.29E-03	Q	QN	QN	Q	2 5
Acidemia 4.4 Dishlorethone	4.05E-03	4.05E-03	9	QN	ND	Q	Q S
1,1-Dictional fall fall for the fall fall fall fall fall fall fall fal	7.68E-03	7.68E-03	2	QN	ON	QN.	ON ISS
riedii 113	1.84E-01	1.07E-01	1.10E-06	3.41E-05	4.98E-04	1.140E-08	1.66E-04
Acetorie Mathyl Iodide	5.81E-03	5.81E-03	QN	QN	QN	2	2
Metriyi Todiye	3.11E-03	3.11E-03	Ð	QN	QN	2	ON S
Astonitile	9.82E-02	8.39E-03	1.10E-06	3.41E-05	4.97E-04	1.138E-08	1.66E-04
Acetominale 3-Chloropropene	3.13E-03	3.13E-03	QN	QN	QN	ND 1 248T 98	ND 4 82E-04
Methylene Chloride	1.39E-01	4.52E-02	1.20E-06	3.74E-05	5.45E-04	1.240E-U0	NO ON
tert-Butyl Alcohol	3.03E-03	3.03E-03	QN I	ND 7 SET SE	ND 4 07E-04	2 454E-09	3.57E-05
Acrylonitrile	1.95E-02	2.17E-03	2.36E-0/	7.33E-U0	CN CN	CN	2
trans-1,2-Dichloroethene	3.96E-03	3.96E-03	2 2	2 2	S	Q	S
Methyl t-Butyl Ether	3.61E-03	3.61E-U3		2 2	CN	Q.	2
Hexane	9.52E-02	1.37E-01	2	2 2	2 2	QV	QN
1,1-Dichloroethane	3.97E-03	3.97E-03	2	2 2		S	S
Vinyl Acetate	3.52E-03	3.52E-03	2	2 2		S	2
cis-1,2-Dichloroethene	3.96E-03	3.96E-03	2	2 2	C Z	Q	2
2-Butanone	2.95E-03	2.95E-03	ON CO	100 P	5 89E-05	1.350E-09	1.96E-05
Ethyl Acetate	1.08E-02	3.60E-03	1.305-07	4.041			

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

					All opening to a second of	-	4 round
	Ö	Cartridge, 0.50 calibe	0.50 caliber, Tracer, M17 (M2)		Notifical of Notifica (1).		
		DODIC	A571		Release duration (t):	3	seconds
	Num	Number of items tested =		3	Unit Concentration (UC):	6.870E-05 (g/m³)/(g/s)	(a/m²)/(g/s)
	Net Explosive We	osive Weight (lbs) =		3.21E-02			
	A STATE OF FILING TEST RESUITS TO STATE OF THE STATE OF T	ATCE Fising ST	est Results #		Total Mass of Substance	Average Modeled	Pollutant
		Measured	Average Adjusted		Emitted (grams/item)	Concentration for One Item	Emission Rate for One Item
Compound	Measured Actual Concentration	Background	Emission Factor	Average Adjusted Emission Factor	(110)	(grams/m³)	(a/sec)
	(mg/m ₃)	(mg/m ₃)	EF (10/16/11)	(Ib/Ib NEW)	Σ	CONC	ER,
1 4 - 4 h	3 525-03	3.52E-03	QN	S	QN	ON	DN
Methyl Actylate Chloroform	4.88E-03	4.88E-03	Q	QN	ON	QN	Q
4 4 4 Trichlomothane	3.82E-03	3.82E-03	4.91E-09	1.53E-07	2.23E-06	5.096E-11	7.42E-07
Carbon Tetrachloride	6.29E-03	6.29E-03	QN	ND	QN	QN	Q
1 2-Dichlorethane	6.07E-03	4.05E-03	7.34E-08	2.28E-06	3.33E-05	7.628E-10	1.11E-05
Benzene	3.12E-01	9.59E-04	3.76E-06	1.17E-04	1.71E-03	3.907E-08	5.09E-04
Isooctane	4.67E-03	4.67E-03	QN	Q	QN	OS S	2 2
Heotane	4.10E-03	2.46E-03	QN	Q	QN	2 2	2 2
Trichloroethane	4.88E-03	4.88E-03	ON	Q	QN	Q S	2 2
Ethyl Acrylate	4.09E-03	4.09E-03	ON	Q.	QN	ON !	
1 2-Dichloropropane	4.62E-03	4.62E-03	QN	2	QN	Q S	
Methyl Methacrylate	4.09E-03	4.09E-03	QN	QN	QN	2 5	2 2
Dibromomethane	7.11E-03	7.11E-03	QN	Q	QN	2 2	
1.4-Dioxane	3.60E-03	3.60E-03	Q	2	ON	2 2	2 2
Bromodichloromethane	6.70E-03	6.70E-03	Q	Q	ON	2 2	
4-Methyl-2-Pentanone	4.10E-03	4.10E-03	Q	QN	ON C L	ON 3904 A	6.44E-05
Toluene	3.58E-02	7.54E-04	4.26E-07	1.33E-05	1.93E-04	4.420E-09	NO. THE
Octane	4.67E-03	4.67E-03	9	2	2 2	2 2	2
trans-1,3-Dichloropropene	4.54E-03	4.54E-03	2	Q Q		QN	Q
Ethyl Methacrylate	4.67E-03	4.67E-03	2 2	2 2	S	QN	QN
1,1,2-Trichloroethane	5.46E-03	3.40E-03	2 5	S	Q	QN	Q.
Tertrachloroethene	6.78E-U3	0.70E-03	2 2		QX	Q	QN
2-Hexanone	4. IUE-US	P 50E-03	S	Q	QN	2	QN
Dibromochloromethane	0.32E-03	7.68E-03	2	Q	QN	Q	ON
1,2-Dibromoethane	7.000-03	7.00C-03	S	S	QN	S	QN
Chlorobenzene	4.50E-03	4.00E-03	C C	2 5	GN	S	QN
1,1,1,2-Tetrachioroethane	6.8/E-03	0.8/E-U3	10 HOE OB	1 ORF-06	1.55E-05	3.550E-10	5.17E-06
Ethylbenzene	2.82E-03	4.345-03	9.42L-00	2015-06	2.93E-05	6.720E-10	9.78E-06
m/p-Xylene	6.51E-03	1.505-05	0.47 1-00	2.0.7	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

•					A Charles of the second		1 round
	0	Cartridge, 0.50 calibe	0.50 caliber, Tracer, M17 (M2)		Nulliber of Routins (1).		
		DODIC	A571		Release duration (t):	3	seconds
	MnN	Number of items tested =		3	Unit Concentration (UC):	6.870E-05 (g/m²)/(g/s	(g/m²)/(g/s)
	Net Fxn	Net Explosive Weight (lbs) =	3.21	3.21E-02			
	de sou	ATC FINISH	C FILING Test Results - Free - Free		Total Mass of Substance	Average Modeled	Pollutant
	The second second				Emitted	Concentration for	Emission Rate
Compound	Measured Actual	Measured	Average Adjusted Emission Factor	Average Adjusted Emission Factor	(grams/item)	One Item (grams/m³)	(jes/g)
	(m/gm)	Concentration (mg/m³)	(lb/item) EF	(Ib/Ib NEW)	W	CONC	ER,
	4 245 02	A 34E-03	5.27E-08	1.64E-06	2.39E-05	5.473E-10	7.97E-06
o-Xylene	4.346-03	4.34E-03	1.29E-07	4.01E-06	5.85E-05	1.340E-09	1.95E-05
Styrene	1.07 =-02	1 03F-02	Q	9	QN	QN	2
Bromoform	4 92F-02	4.92E-03	Q	QN	ND	QN	2
Cumene	A 07E-03	6.87E-03	QN	QN	ND	Q	2
1,1,2,2-Tetrachlorethane	6.03E-03	6.03E-03	QV	QN	QN	QN S	
1, Z, 3-1 II CIII Oli Opi opai ia	6.42F-03	6.42E-03	9	QN	ON	ON	2 2
Bromopenzene	4.92E-03	4.92E-03	QN	QN	QV	Q	
4-Eurynoluerie	4.92E-03	4.92E-03	QN	QN	QN		222
1,3,3-11IIIIetilyibelizette	4.83E-03	4.83E-03	QN	QN	QN	ON DEC.	4 70E 06
Alpila Melliyi Otylerie	9.83E-04	4.92E-03	1.18E-08	3.68E-07	5.36E-06	1.22/E-10	I./ 9E-00
1,4,4-11iiidaiyisciizoisc	6.01E-03	6.01E-03	QN	Q	QN	2 2	2 2
1,3-Dichlorobenzene	6.01E-03	6.01E-03	QN	QN	QN	2 2	2 2
1,4-Didiloposizono	5.18E-03	5.18E-03	QN	Q	QN		2 2
5 Pickloroberzene	6.01E-03	6.01E-03	QN	QN	QN		2 2
1,z-Dictionations	9.68E-03	9.68E-03	QN	<u>Q</u>	QN	2 2	2 2
1 2 4. Trichlorohenzene	7.42E-03	7.42E-03	QN	9		2 2	Q Q
Hexachlorobutadiene	1.07E-02	1.07E-02	Q	QN	QN.	95	
VOC Tentatively Identified Compounds (TICs	ounds (TICs)						
Hydrocarbons			10 101 0	4 48E-03	1 72F-02	3.934E-07	5.73E-03
Methane	4.10E+00	1.10E+00	3.795-03	7 575 05	1 10E-03	2.526E-08	3.68E-04
Ethylene	2.00E-01	2.29E-02	2.43E-06	4 025 05	1.152.02	3.453E-09	5.03E-05
Acetylene	2.74E-02	2.13E-02	3.325-07	1.035-03	6 235 04	1 427E-08	2.08E-04
Ethane	1.13E-01	2.46E-02	1.37E-06	4.27.5-03	2 00E-04	6.842E-09	9.96E-05
Propylene	5.42E-02	3.44E-02	6.58E-07	Z.U3E-U3	ON	Q	Q
Propane	3.61E-02	3.61E-02	2	Q 4		GN	9
Propyne	3.20E-02	3.20E-02	Q	2		CZ	2
Isobutane	4.75E-02	4.75E-02	Q	2 4		G	9
1-Butene/Isobutviene	9.18E-02	9.18E-02	QN	2	GN		

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Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

					(0) The second of the second o		4 round
	<u>ප</u>	Cartridge, 0.50 calibe	, 0.50 caliber, Tracer, M17 (M2)		Number of Rounds (1).		200
		DODIC:	A571		Release duration (t):	31	seconds
	Numb	Number of items tested =		3	Unit Concentration (UC):	6.870E-05 (g/m²)/(g/s)	(a/m²)/(g/s)
	Net Explosive W	sive Weight (lbs) =	3.21	3.21E-02			
	ATC Firing Test Results 1	ATC Firing T	est Results Par		Total Mass of Substance	Average Modeled	Pollutant
		Measured	Average Adjusted		Emitted (crome/item)	Concentration for One Item	Emission Rate for One Item
Compound	Measured Actual Concentration	Background	Emission Factor	Average Adjusted Emission Factor	(1)	(grams/m³)	(a/sec)
	(mg/m ₃)	(mg/m³)	EF EF	(Ib/Ib NEW)	Σ	CONC	ER,
1	A 505 02	4 59F-02	QN	ΩN	QN	QN	QN
1,3-Butadiene/butane	4.33C-02 4.59F-02	4.59E-02	Q	Q	ON	QN	9
dis-buterie	4 59F-02	4.59E-02	Q	QV	QN	9	Q
I-butyrie	4.59E-02	4.59E-02	Q	QN	ON	Q	Q !
rans-burene	4 42E-02	4.42E-02	R	2	ON	Q	Q
Z-butyne	5.90E-02	5.90E-02	QN	QN	QN	Q	
TIPL GINGING	1.99E-01	7.05E-02	2.41E-06	7.50E-05	1.09E-03	2.505E-08	3.65⊑-04
SVOCe							1
N pitrosodimethylamine	1.81E-02	1.83E-02	QN	QN	QN	QN	2
Dis/2 shorothylother	1.81E-02	1.83E-02	S	QN	QN	QN	
Bis(z-cinoroeury) Jeurer	1.81E-02	1.83E-02	Q.	QN	QN	Q	Q S
2 objects benefit	1.81E-02	1.83E-02	S	QN	QN	Q	2
2-ciliotophichol	1.81E-02	1.83E-02	QN	QN	QN	Q !	2 5
1 A dichlorobenzene	1.81E-02	1.83E-02	QN	Q	QN	QN:	2 4
1,4-diction obelication	1.81E-02	1.83E-02	Q	QN	QN	2	2 5
1,z-dichiolobenzenie	1 81E-02	1.83E-02	Q	Q	ND	Q	QN
Benzyl alconol	1 815-02	1 83F-02	2	<u>Q</u>	QN	2	Q
Bis(z-cnioroisopropyi)etilei	1.81E-02	1.83E-02	9	QN	QN	Q	Q.
Z-Ineurylphenol	1.81E-02	1.83E-02	2	QN	QN	Q	2
N aitono di a propulamine	1.81E-02	1.83E-02	Q.	QN	ON	Q	
N-Indoso-di-II-propylatinio	1 R1F-02	1.83E-02	₽	QN	ND	Q	ON!
4-metnylphenol	1 845-02	1.83E-02	<u>Q</u>	QN	QN	Q	QN
Nitrobenzene	1 845-02	1.83E-02	Q	S	QN	Q	QN
Isophorone	1 845-02	1 83F-02	Q	g	QN	QN	Q
Z-nitropnenoi	4 945 02	1 R3E-02	CN	2	QN	QV	Q
2,4-dimethylphenol	1.01E-02	4 83E-02	S	9	QN	QN	Q
Bis(2-chloroethoxy)methane	1.015-02	1.035-02	S	2	QN	QN	QV
2,4-dichlorophenol	1.81E-02	1.03E-02	2 2	2	QN	QV	QN
1,2,4-trichlorobenzene	1.010-02	1.03[-02	2 17E-07	6.76E-06	9.86E-05	2.259E-09	3.29E-05
Naphthalene	1.79E-02	1.0004					

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

						,	
		Cartridge 0.50 calibe	0.50 caliber. Tracer, M17 (M2)		Number of Rounds (1):		1 round
		_1	AE74		Release duration (t):	3	seconds
		חסחוכי		3	Unit Concentration (UC):	6.870E-05	6.870E-05 (g/m³)/(g/s)
	Num	Number of items tested =					
	Net Exp	Net Explosive Weight (lbs) =		3.21E-02			
		ATC Firing Te	C Firing Test/Results 🗺 🖺		Total Mass of Substance	Average Modeled	Pollutant
		Mooning	Asserted Adjusted		Emitted (grams/item)	Concentration for One Item	for One Item
	Measured Actual	Backoround	Fmission Factor	Average Adjusted	(glallis/telli)	(grams/m³)	(a/sec)
Compound	Concentration	Concentration	(lb/item)	Emission Factor)	ĺ
	(mg/m ₃)	(mg/m³)	Ш		Σ	CONC	ER,
				2	CZ	QN	QN
4-chloroaniline	1.81E-02	1.83E-02		2 2	CZ	QN	QN
Hexachlorobutadiene	1.81E-02	1.83E-02	2 5	2 2	CZ	Q	QN
4-bloro-3-methylphenol	1.81E-02	1.83E-02	QN.	2 2	CZ	2	ΩN
2-methylnaphthalene	1.81E-02	1.83E-02	0	S S	CZ	Q	QN
Havachlorocyclopentadiene	1.81E-02	1.83E-02	2	2 2	CN	9	2
2 4 6-trichlorophenol	1.81E-02	1.83E-02	2	2	S	2	S
2 4 5 trichlorophenol	1.81E-02	1.83E-02	S	2 2	CZ	Q	2
2,4,0-ulcinolopiiono	1.81E-02	1.83E-02	2	2		QN	Q
Z-UllOllaphiniaring	1.81E-02	1.83E-02	2	ON!		CN	Q
A-muoanimie A-manaphydono	1.81E-02	1.83E-02	Q	2		CN	2
Acenaphilitylerie	1.81E-02	1.83E-02	QN	2	ON C	2 2	CZ
Dimethylphthalate	1 81E-02	1.83E-02	Q	QN	QN		2
2,6-dinitrotoluene	1.01E-02	1.83E-02	₽	QN	QN	2 2	2 2
Acenaphthene	20-110.1	3.67E-02	2	QN	QN	2	
3-nitroaniline	3.045-02	3.67E-02	₽	QN	QN		2 2
2,4-dinitrophenol	4 R1E-02	1 83E-02	₽	QN	QN		
Dibenzofuran	1.015-02	1.83E-02	2	QN	QN		2 2
2,4-dinitrotoluene	3 825.02	3 67E-02	S	Q	QN		2 2
4-nitrophenol	3.02E-02	1.83E-02	운	QN	QN	2 2	2 2
Fluorene	1 845-02	1.83E-02	QV	Q	QN		2 2
4-chlorophenyl-phenyletner	4 045 05	1 83F-02	2	Q	QN	2 !	2 2
Diethylphthalate	1.015-02	3 67F-02	2	2	QN	QN S	2 2
4-nitroaniline	3.025-02	3 67E-02	2	2	QN	S	2 9
4,6-dinitro-2-methylphenol	3.625-02	20.01	S	2	QN	2	
N-nitrosodiphenylamine(1)	1.81E-02	1.03E-02	2 2	S	QN	2	Q
4-bromophenyl-phenylether	1.81E-02	1.83E-02	2 2	2	QN	2	QN
Hevachlorobenzene	1.81E-02	1.83E-02	ב צ		CZ	S	QN
Dontacklorophonol	3.62E-02	3.67E-02	QN	2 2		QN	Q
Photographics	1.81E-02	1.83E-02	2	Q	2	S	2
riterianunene A-Aksosoo	1.81E-02	1.83E-02	Q	Q	GN		
Antifraceire							

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

	0	Cartridge, 0.50 calibe	0.50 caliber, Tracer, M17 (M2)		Number of Rounds (I):		Lonna
		DODIC	A571		Release duration (t):	3	3 seconds
	Numt	Number of items tested =		3	Unit Concentration (UC):	6.870E-05	6.870E-05 (g/m³)/(g/s)
	Net Expl	Net Explosive Weight (lbs) =	3.21	3.21E-02			
	**************************************	***ATC/FILINGST	st Resultske		Total Mass of Substance	Average Modeled	Pollutant
Compound	Measured Actual Concentration	Measured Background	Average Adjusted Emission Factor	Average Adjusted Emission Factor	Emitted (grams/item)	Concentration for One Item (grams/m³)	Emission Rate for One Item (g/sec)
	(mg/m³)	Concentration (mg/m³)	(ib/item) EF	(Ib/Ib NEW)	Σ	CONC	ER,
Di-n-butylphthalate	1.81E-02	1.83E-02	QN	QN	ON	QN	QN
Fluoranthene	1.81E-02	1.83E-02	QN	QN	ND	QN	QN
Pyrene	1.81E-02	1.83E-02	QN	QN	ON	NO	Q
Butylbenzylphthalate	1.81E-02	1.83E-02	QN	QN	ND	QN	QN
Benzo(a)anthracene	1.81E-02	1.83E-02	QN	QN	QN	ON	Q
Chrysene	1.81E-02	1.83E-02	QN	ND	ND	QN	Q
3,3-dichlorobenzidine	1.81E-02	1.83E-02	ND	ND	ND	QN	Q
Bis(2-ethylhexyl)phthalate	9.11E-01	2.02E-01	8.94E-06	2.78E-04	4.06E-03	9.288E-08	1.35E-03
Di-n-octylphthalate	1.81E-02	1.83E-02	ND	ND	ND	QN	Q
Benzo(b)fluoranthene	1.81E-02	1.83E-02	ND	ND ND	ND	QN	S
Benzo(k)fluoranthene	1.81E-02	1.83E-02	QN	QN	ND	ΩN	Q
Benzo(a)pyrene	1.81E-02	1.83E-02	ND	N	ND	QN	Q
Indeno(1,2,3-cd)pyrene	1.81E-02	1.83E-02	ND	ND	ΩN	QN	Q
Dibenz(a,h)anthracene	1.81E-02	1.83E-02	ON	ND	ON	QN	Q
Benzo(g,h,i)perylene	1.81E-02	1.83E-02	QN	ND	ON	Q	2
SVOC Tentatively Identified Compounds (TICs)	pounds (TICs)						
TO-13 (PAHs)							
Naphthalene	1.61E-02	5.50E-03	1.36E-07	4.23E-06	6.17E-05	1.412E-09	2.06E-05
Acenaphthylene	7.87E-04	1.83E-05	9.55E-09	2.97E-07	4.33E-06	9.924E-11	1.44E-06
Acenaphthene	1.35E-04	4.77E-05	1.12E-09	3.48E-08	5.08E-07	1.164E-11	1.69E-07
Fluorene	3.62E-04	3.85E-05	3.98E-09	1.24E-07	1.80E-06	4.130E-11	6.01E-07
Phenanthrene	3.35E-04	7.88E-05	3.21E-09	9.98E-08	1.46E-06	3.333E-11	4.85E-07
Anthracene	4.43E-05	1.83E-05	5.38E-10	1.67E-08	2.44E-07	5.585E-12	8.13E-08
Fluoranthene	3.35E-04	1.83E-05	4.05E-09	1.26E-07	1.84E-06	4.210E-11	6.13E-07
Pyrene	4.80E-04	1.83E-05	5.81E-09	1.81E-07	2.64E-06	6.036E-11	8.79E-07
Benzo(a)anthracene	2.47E-04	1.83E-05	2.98E-09	9.27E-08	1.35E-06	3.094E-11	4.50E-07
Chrysene	2.54E-04	1.83E-05	3.07E-09	9.54E-08	1.39E-06	3.187E-11	4.64E-07
Benzo(b)fluoranthene	3.98E-04	1.83E-05	4.82E-09	1.50E-07	2.19E-06	5.011E-11	7.29E-07
Benzo(k)fluoranthene	2.33E-04	1.83E-05	2.82E-09	8.76E-08	1.28E-06	2.926E-11	4.26E-07

3

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

		Cartridge, 0.50 calibe	0.50 caliber, Tracer, M17 (M2)		Number of Rounds (I):	1	1 round
		1	A571		Release duration (t):	3	3 seconds
	Num	Number of items tested =		3	Unit Concentration (UC):	6.870E-05	6.870E-05 (g/m³)/(g/s)
	Net Explosive V	losive Weight (lbs) =	3.21	3.21E-02			
	AT STATE OF THE ST	**************************************	IC Firing Test Results		Total Mass of Substance	Average Modeled	Pollutant
		Manager	ile V		Emitted	Concentration for	Emission Rate
Compound	Measured Actual Concentration	Background	Emission Factor	Average Adjusted Emission Factor	(grams/item)	One item (grams/m³)	for One Item (g/sec)
	(mg/m³)	Concentration (mg/m³)	(ID/Item) EF	(Ib/Ib NEW)	Σ	CONC	ER,
Benzo(e)byrene	4.80E-04	1.83E-05	5.82E-09	1.81E-07	2.64E-06	6.042E-11	8.80E-07
Benzo(a)pyrene	3.44E-04	1.83E-05	4.17E-09	1.30E-07	1.89E-06	4.331E-11	6.30E-07
Indeno(1,2,3-cd)pyrene	3.71E-04	1.83E-05	4.50E-09	1.40E-07	2.04E-06	4.673E-11	6.80E-07
Dibenz(a,h)anthracene	4.17E-05	1.83E-05	5.04E-10	1.57E-08	2.29E-07	5.238E-12	7.62E-08
Benzo(g,h,i)perylene	7.05E-04	1.83E-05	8.56E-09	2.66E-07	3.88E-06	8.895E-11	1.29E-06
Dioxins and Furans							
2378-Tetrachlorodibenzo-p-dioxin	3.75E-09	3.61E-09	<u>Q</u>	Q	ΩN	QN	Q S
12378-Pentachlorodibenzo-p-dioxin	3.59E-09	3.40E-09	2	Q	QN	Q	ON.
123478-Hexachlorodibenzo-p-dioxin	4.38E-09	4.20E-09	QN	Q	QN	QN !	Q !
123678-Hexachlorodibenzo-p-dioxin	4.53E-09	4.25E-09	QN	Q	QN	QN	Q !
123789-Hexachlorodibenzo-p-dioxin	7.24E-09	6.88E-09	QN	Q	QN	Q	QN .
1234678-Heptachlorodibenzo-p-dioxin	1.40E-08	5.35E-09	1.12E-13	3.49E-12	5.09E-11	1.166E-15	1.70E-11
ОСВВ	2.14E-07	6.58E-08	1.89E-12	5.88E-11	8.58E-10	1.964E-14	2.86E-10
2378-Tetrachlorodibenzo-p-furan	3.84E-09	3.61E-09	QN	Q	QN	Q	Q :
12378-Pentachlorodibenzo-p-furan	3.80E-09	3.65E-09	ON	Q	QN	Q	Q !
23478-Pentachlorodibenzo-o-furan	2.33E-09	2.16E-09	ΩN	QN	QN	Q S	2
123478-Hexachlorodibenzo-p-furan	3.17E-09	2.97E-09	Q	2	QN	2 5	2 2
123678-Hexachlorodibenzo-p-furan	3.31E-09	3.02E-09	QN	9	2	2 2	2 2
123789-Hexachlorodibenzo-p-furan	2.87E-09	2.70E-09	Q S	2 2	S S	2 2	2 2
234678-Hexachlorodibenzo-p-furan	2.2/E-09	2.13E-09	3 28E 11	1 05E-12	1 53F-11	3.508E-16	5.11E-12
12346/6-Deptachiorodiberzon furan	5.78E-09	5.62F-09	QN	Q	Q.	Q	Q
OCDF	9.51E-09	5.10E-09	1.16E-13	3.60E-12	5.25E-11	1.202E-15	1.75E-11
Energetics							
Nitrobenzene	3.51E-03	ΝΑ	Q	2	QN	QN.	2
2-Nitrotoluene	3.51E-03	ΝΑ	QN	Q	QN	2	2
3-Nitrotoluene	3.51E-03	NA	Q	Q	Q	2	2 2
4-Nitrotoluene	3.51E-03	ΑN	Q	Q	QN		2 2
Nitroglycerine	3.51E-03	ΑĀ	Q	QN	ON	Q	ON

Table B-2: Air Modeling Output Data for the Cartridge, 0.50 Caliber Tracer, M17 (M2) - 200 meter location

						,	7
		odiloo O EO colibo	r Tracer M17 (M2)		Number of Rounds (I):		1 round
		Carridge, 0.30 Caliber, Hacer, mr. (m.)	1, 11acol, 1111 (1117)		Release duration (t):	8	3 seconds
		DODIC	A5/1			6 870E-05 (21m3)((9/6)	2/m3/(a/c)
	Num	Number of items tested =	3		Unit Concentration (UC).	0.01010	d/111 // (d/s)
	Not Evolusive	acive Weight (lbs) =	3.21E-02	E-02			
	V as a second se	SMATCE Firm of Test Results	stiResults and		Total Mass of Substance	Average Modeled	Pollutant
	ない はななな のは はない かんしん	O La Contraction de la Contrac	7		Po#itto	Concentration for	Emission Rate
		Measured	Average Adjusted	Pataripy Adinated	(grams/item)	One Item	for One Item
Compound	Measured Actual	Background	Emission Factor	Emission Factor	?	(grams/m³)	(a/sec)
	Concentration	Concentration	(lb/item)	(IN/IN NEW)			(
	(mg/m ₂)	(mg/m ₃)	Щ.		Σ	CONC	EK,
					4	S	S
	3 54F_03	ΝΑΝ	Q.	Q	ON		2
1,3-Dinitrobenzene	20.11.0.0	VIV	Š	S	QN	O.	
2,6-Dinitrotoluene	3.51E-03	5		S	QN	QN	QN
2 4-Dinitrotoluene	3.51E-03	ΝΑ			CN	Q	9
1 3 5 Trinitrobenzene	3.51E-03	NA	Q	2 4	2	GN	Q
1,3,3-Timinoscrizono	3.51E-03	NA	Q	QN	2 4	S	QN
Z,4,0-111111000000110	3.51F-03	ΨN	2	QN	Q.		S
RDX	2 545 03	AN	2	QN	ON	ON!	2 2
4-Amino-2,6-Dinitrotoluene	3.315-03	ΔIN	Q	S	ND	QN	2 2
2-Amino-4,6-Dinitrotoluene	3.315-03		S	Q	QN	Q	
Tetryl	3.51E-U3	<u> </u>		CN	QN	Q	QN
HMX	7.01E-03	¥Z		S	CZ	Q	QN
Pentaerythritoltetranitrate	7.01E-03	A'A	2 5	2 2	CN	2	ΩN
Dibutyl ohthalate	1.75E-01	NA	2 5		CN	Q.	QN
Dioctyl ohthalate	1.75E-01	ΑN	2	2 2		9	QN
Diohenvlamine	8.77E-02	NA	QN	2			

Footnotes:

¹ATC = Aberdeen Test Center (for additional information on the data, refer to the Firing Point Emission Study)
NA = Not Applicable
ND = Not Detected

APPENDIX C

HEALTH-BASED SCREENING LEVELS AND ACUTE TOXICITY VALUES

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

Compound	# \$*2 C^S #	Region 9 PRG* (ug/m³)	Toxicity: Endpoint (c or ne)	Regioni3 PRBC (IIg/m ³)	Toxicity Endpoliti (c.or.nc)	(m@n).	ERPG (19/m)	((<u>u//o</u> ji) 1 <u> </u> 1	AEGL (pg/m²)	Source (T. O. E.)	្នឹ ងប ្រ (ពិច្ចិត្តា)
Dormanant Gases											
Ammonia (NH ₃)	7664-41-7	1.04E+02	nc	104.39	2L	1.04E+02	1.75E+04	1.75E+04	¥	ш	1.75E+04
Carbon Dioxide (CO ₂)	124-38-9	A A		NA			₹	5.40E+07	∀ Z	⊢ ւ	5.40E+07
Carbon Monoxide (CO)	630-08-0	1.00E+04	nc	ΑN		_	2.30E+05	2.28E+05	₹.	ш	2.30E+05
Oxides of Nitrogen (as NO)	10102-43-9	1.00E+02	рu	AN		1.00E+02	₹	3.08E+04	¥		3.08E+04
Sulfur Dioxide (SO ₂)	7446-09-5	8.00E+01	nc	AN		8.00E+01	7.89E+02	7.86E+02	¥ A	ш	7.89E+02
Acid Gases						1	100	20.7	414	u	4 ROE+03
Hydrogen fluoride	7664-39-3	NA		ΑN		-	1.60E+03	1.64=+03	¥ S	טע	1.00E+03
Hydrogen chloride	7647-01-0	2.08E+01	20	2.08E+01	nc	Ş	4.50E+03	4.4/E+03	₹	ㅂ	4.30E+03
Hydrogen bromide	10035-10-6	NA		NA		ΨN	AA	9.93E+03	YN.	-	9.33L 103
Nitric Acid	7697-37-2	ΑN		NA		Ϋ́	¥	2.58E+03	1.30=+03	∢ }	1.50E+US
Dhoenhoric acid	7664-38-2	1.04E+01	ЭĽ	1.06E+01	၁ပ	1.04E+01	¥	3.00E+03	₹ Z	-	3.000
Sulfurio Acid	7664-93-9	AN		NA		Ϋ́	2.00E+03	2.00E+03	₹ Z	ш	Z.00=+03
Cvanida											700
Doction late Cvanide	57-12-5	Ϋ́Z		7.30E+01	nc	7.30E+01	¥	5.00E+03	ΨZ	_	5.00E+03
Trainculate Oyalitue	74-90-8	3.13E+00	υc	3.14E+00	nc	3.13E+00	Ϋ́	5.17E+03	¥	-	5.17=+03
Tydiogen Cyannac											
Pariculates	12789-66-1	5 00F+01	2	ΑN		5.00E+01	NA	NA	ΑĀ		ĕ
Total Suspended Fatticulate	20121	5 00F+01	2	AN		5.00E+01	AN	NA NA	NA		A A
FM10		4 50 0 101	2	NA		1.50E+01	¥	ΑN	NA		NA
PM _{2.5}		1.000.1	2								
Metals	1	177		00-11-00	G	5 44E+00	AM	3 00F+04	¥	-	3.00E+04
Aluminum	7429-90-5	5.11=+00	2	3.035.100	2 2	4 48E+00	ΔN	1 50F+03	ĄN	-	1.50E+03
Antimony	7440-36-0	AN .		1.40E+00	2 0	4 47E-04	Z Z	3.00E+01	¥	-	3.00E+01
Arsenic	7440-38-2	4.47E-04	υ	4.13E-04	٤	5.21E-01	¥Z	1.50E+03	¥	-	1.50E+03
Barium	7440-39-3	5.21E-01	2	0.110.0	2 0	9.00	ΔN	5 OOF +OO	AN	_	5,00E+00
Beryllium	7440-41-7	8.00E-04	ပ	7.45E-04	J (4 07E 03	<u> </u>	3.00E+01	₹ V	-	3.00E+01
Cadmium	7440-43-9	1.07E-03	υ	9.84E-04	، اد	1.07		3 OOE + 04	ΑN	-	3.00E+04
Calcium	7440-70-2	Ą Z		AN C	5	Y L	<u> </u>	4 50E+03	ΔN	-	1.50E+03
Chromium	7440-47-3		O	1.53E-04	0	1.33E-04	<u> </u>	8.00 8.00 8.00 8.00 8.00 8.00 8.00 8.00	₹ N	-	6.00E+01
Cobalt	7440-48-4	A A		2.20E+02	20	2.20E+02	<u> </u>	9.00	<u> </u>	- -	3 OOF +03
Copper	7440-50-8	Ϋ́		1.46E+02	ည	1.40E+02	¥ <	3.00E+03		- -	1 50F+02
Lead	7439-92-1	1.50E+00	20	¥ Z		1.50=+00	₹.	1.300-102	\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \	- -	3 00E+04
Magnesium	7439-95-4			Ϋ́		NA I	¥ :	3.00E+04	<u> </u>	-	3 00 0 +03
Mandanese	7439-96-5	5.11E-02	nc	5.22E-02	ဥ	5.11E-02	₹ Z	3.00=+03		- -	3.000-103
Nickel	7440-02-0	¥		7.30E+01	ဥ	7.30E+01	¥	3.00E+03	¥		3.00=100
INIONO											

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

		ð.	Toxicity	Ö.	Toxicity	SOH	ERPC	(EEL	JISEV.	Source	ATV
Compound	CAS#	(lig/m³)		([w/bn)	(ວຸດເກວງ) ເຂົ້າ	((EU)Br)	(A)	种的的	(T.or E)	4 9
を持ちます。 1975年の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の日本の	7782.40-2	NA	A CONTRACTOR OF THE CONTRACTOR	_	nc	1.83E+01	ΑN	6.00E+02	ΑN	_	6.00E+02
Selenium	7740-22-4	¥2		1.83E+01	2	1.83E+01	NA	3.00E+02	NA	-	3.00E+02
Thellim	7440-28-0	¥		2.56E-01	nc	2.56E-01	ΑN	3.00E+02	¥	-	3.00E+02
Vanadium	7440-62-2	NA		2.56E+01	nc	2.56E+01	¥	1.50E+02	¥.	-	1.50E+02
Zinc	7440-66-6	AN		1.10E+03	uc	1.10E+03	ΑN	3.00E+04	¥ V	_	3.00=+04
TO-11 Carbonvis								100			4 225+03
Formaldehyde	50-00-0	1.48E-01	ပ	1.39E-01	υ	1.48E-01	1.23E+03	1.23E+03	¥Z.	սև	1.235+03
Acetaldehyde	75-07-0	8.73E-01	υ	8.13E-01	ပ	8.73E-01	1.80E+04	1.80E+04	YZ S	IJŀ	1.80E+04
Acetone	67-64-1	3.65E+02	nc	3.65E+02	ည	3.65E+02	AN I	2.37E+06	X S	-	2 205 +00
Acrolein	107-02-8	2.09E-02	nc	2.08E-02	ျင	2.09E-02	2.30E+02	2.29E+02	X	ㅂ	7.505+02
Proprionaldehyde	123-38-6	ΑN		NA		Ą	A A	7.50E+04	Y :	- ı	7.305+04
Crotonaldehyde	4170-30-3	3.54E-03	O	3.30E-03	ပ	3.54E-03	5.72E+03	5.72E+03	A N	الد	5.72E+03
Butwaldahyda	123-72-8	ΑZ		NA NA		A A	Y V	7.38E+04	A V		7.38E+04
Daylandenyde	100-52-7	3.65E+02	2	3.65E+02	nc	3.65E+02	NA	1.50E+04	Ą		1.50E+04
legizaldeliyde Isovoloroldebyde	590-86-3	Ϋ́		Ϋ́		NA	NA	Ą	¥		¥.
isovaleralueriyue	110-62-3	ΑN		Ϋ́		ΑN	AN	A V	Ϋ́		A V
Valeraldellyue	1334.78.7	ΦN		¥		ΑN	ΑN	AN	NA		¥ N
o,m,p-1 olualdenyde	56.25.4	ΔIN		AN AN		ΑN	Ą	AN	AN		Ϋ́
Hexaldenyde	E770 04.2			ΑN		ΑN	ΑN	ΑN	AN		٩
2,5-Uimetnyibenzaidenyde	7-46-6776	5									
VOCs	, 10	414		2		ΔN	A N	₹ Z	Ϋ́		ΑN
Propene	115-0/-1	AN C		100	2	2 095+02	ΔZ	1 48F+07		-	1.48E+07
Dichlorodifluoromethane	75-71-8	2.09E+02		1.03E+04 F 41E+04	2 2		Ž	4.41E+06		-	4.41E+06
Chlorodifluoromethane	0-24-0/	3.116+04	2	3.17	2	AN	ĄZ	2 10E+07		-	2.10E+07
Freon 114	74.87.2	1 07E+00		1 70E+00	C	1 07E+00	¥	2.06E+05		-	2.06E+05
Chloromethane	75 04 4	2 20E-02	٥	2 10F-02	٥	2.20E-02	¥	1.28E+04		⊢	1.28E+04
Vinyl Chloride	10-07	2745 03	, (3 48E-03		3.74E-03	2.20E+04			ш	2.20E+04
1,3-Butadiene	100-88-0	3.74E-03		5 11E+00	Ĺ	5.21E+00				⊢	5.82E+04
Bromomethane	74-83-9	3.215+00		2 4		2 32F+00	L	2 64E+06		 -	2.64E+06
Chloroethane	75-00-3	2.325+00		1 83E±02	Ç	2 09F+02	L	1.48E+07		 -	1.48E+07
Dichlorofluoromethane	0-17-67	7.095-02		7 305 103	┸	7 30F+02		2.81E+06	100	-	2.81E+06
Trichlorofluoromethane	4-69-67	1.30E+02	2	7.30	\perp	ΔN	L	1 80E+06	10	 -	1.80E+06
Pentane	109-66-0	AN O		CO 100 C		2 DOF-02	2 30F+02			ш	2.30E+02
Acrolein	107-02-8	Z.09E-02		Z.UOE-UZ		E 24 E 402	4			-	7.92E+04
1,1-Dichloroethene	75-35-4	5.21E+02		5.11E+02	\perp	3 13 5 + 0 4		9.58E+06	100	-	9.58E+06
Freon 113	76-13-1	3.13E+04		3.14E+04		9.130.404		3.325		-	237F+06
Acetone	67-64-1	3.65E+02	ဥ	3.65=+02	DC .	3.00=+02	1	14:3/1-10			

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

Source Arrv (0.ore) (pg(m³)	9	T 3 11F+04	T	Ť	9	T	†	T	T	T 5 28F+05		T	T 7 92F+05		1		T 0 785+03	1		E 1.28E+05	χ)·	E 1.56E+05				7	T 5.08E+05	4	T 2.50E+05	T 9.00E+04	T 4.00E+03	T 3.07E+05	E 1.88E+05	AN A	NA	NA	T 1.64E+05
)) VEGIT S					-				+ 14	2 4	0 40		1		C G	-	+	500	9	15	3	15	95	90	90	14	5)5)5	74)3	35	35				05
	C. LLY	2 44 5 40	0.1.0	1.0.1	9.39E+05	4 55E+05	2 476+03	4 055 -04	4.90E+04	4.32L	3.20E+U3	1 76E±04	7 025+04	0.325.0	8.835+03	1.446100	₹		_		8.08E+03	1.60E+05	3.50E+05	1.80E+06	1.91E+06	6.14E+04	5.08E+05	4.09E+05	2.50E+05	9.00E+04	4.00E+03	3.07E+05	_	Ϋ́	ΑN	ž	1.64E+05
(ERPC)	000000	145000	¥	NA	9.386+03	200000	Z 2	20/17	₹ <u>₹</u>	¥ .	¥ 2	40450	00181	₹ ÷	¥	₹ :	¥.		1.94E+06	1.28E+05	AN	1.56E+05	¥	ΑN	1.94E+06	¥	ΑĀ	¥ Y	ž	¥	¥	L	1.8	¥	¥		
(Lise)		AN L	7.30E+02	-	-	4.09=+00	¥ L	2.83E-02	7.30E+01	3.135703	2.09E+02	3.215.02	Z.09E+0Z	3.65=+01	1.04E+03	3.29=+03	1.10E+02	8.35E-02	1.04E+03	1.28E-01	7.39E-02	2.49E-01	ΑN	ΑN	1.04E+03	1.40E-01	9.89E-02	7.30E+02	3.65E+01	6.11E-01	1.08E-01	8 34E+01	4.02E+02	Ϋ́	5 17E-02	3.29E+02	1 20E-01
Toxicity Endpoint			ည	2		٥		O	2	ဍ	ဥ	2	nc	ည	ည	2	2	ပ	nc	ပ	၁	O			2		ပ	ဥ	2	C	٥	5	2		٥	2	2 0
mar in the		ΑN	7.30E+02	6.21E+01	AN AN	3.79E+00	∀ N	2.61E-02	7.30E+01	3.13E+03	2.08E+02	5.11=+02	2.08E+02	3.65E+01	1.04E+03	3.29E+03	1.10E+02	7.73E-02	2.30E+03	1.18E-01	6.88E-02	2.16E-01	ĄZ	ΑN	2 30F+03	AN	9.21E-02	7 30E+02	3 65F+01	5 69E-01	1 01E-01	7 305+01		AN AN	1 ROE-02	3.20E+02	4 405 04
Marin Control			DC C	υc	2	O		υ	2	2	2	2	nc	၁ပ	nc	nc	nc	ပ	ဥ	U	U	C	,		ú	2		2	2	2 0	٥	٥	2 6	2		ء اد	2
Region 9 PRG	CHBMT1.7	AA	7.30E+02	6.20E+01	1.04E+00	4.09E+00	ΔA	2.83E-02	7.30E+01	3.13E+03	2.09E+02	5.21E+02	2.09E+02	3.65E+01	1.04E+03	3.29E+03	1.10E+02	8.35E-02	1.04E+03	1 28F-01	7.39F-02	2 49E-01	NA NA	\$ 2	4 04 5 + 03	1 40E 01	0 80E-01	7 305+02	2 65E+04	3.03E .01	4 00 1 01		4 02E+01		771	2.175-02	3.295+02
		74-88-4	75-15-0	75-05-8	107-05-1	75-09-2	75-65-0	107-13-1	156-60-5	1634-04-4	110-54-3	75-34-3	108-05-4	156-59-2	78-93-3	141-78-6	96-33-3	67-66-3	71-55-6	56-23-5	107-06-2	74.43.2	E40 84 4	442 02 5	C-70-741	1 -03-0	2-00-041	9 69 00	00-07-0 74 0F 3	40004	123-91-1	4-17-01	108-10-1	100-00-3	8-00-111	10061-02-6	97-63-2
Compound		Methyl Iodide	Carbon Disulfide	Acetonitrile	3-Chloropropene	Methylene Chloride	tert-Butyl Alcohol	Acrylonitrile	trans-1.2-Dichloroethene	Methyl t-Butyl Ether	Hexane	1.1-Dichloroethane	Vinyl Acetate	cis-1 2-Dichloroethene	2-Butanone	Ethyl Acetate	Methyl Acrylate	Chloroform	4 4 Highlorothone	1, 1, 1-1 right of the right	Carbon Tetracilloride	1,2-Dichloroethane	Benzene	Isooctane (2,2,4-trimetnyipentalie)	Heptane	Trichloroethane	Ethyl Acrylate	1,2-Dichloropropane	Methyl Methacrylate	Dibromomethane	1,4-Dioxane	Bromodichloromethane	4-Methyl-2-Pentanone	Toluene	Octane	trans-1,3-Dichloropropene	Ethyl Methacrylate

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

177-18-4 3.31E+00 C 3.13E+00 C 591-78-6 NA C 5.11E+00 DC 591-78-6 NA C 5.11E+00 DC 124-48-1 8.00E-02 C 7.45E-02 C 106-93-4 8.73E-03 C 8.24E-03 C 106-93-4 8.73E-03 C 2.05E-03 DC 106-93-4 8.73E-03 DC 106-93-4 8.73E-03 DC 106-93-4 8.73E-03 DC 106-93-3 7.30E+03 DC 106-43-3 7.30E+02 DC 106-43-3 T.05E-02 DC 106-43-4 T.05E-02 DC 106-63-6 T.05E-02 DC T.05E-03 DC T.05	(Compound)	CAS#	Region 9	Toxicity Endpoint	Region 3 RBC	FToxicity Endpoint	HBSL	e dise	TEBL	AEGL	Source	ATIV
127-184 3.31E+00 c 3.13E+00 c 3.18E+00 NA 4.09E+04 T 4.00E+04 T 4.09E+04 T 4.09E+04 T 4.00E+04 T 4.00E+04			4.4	*(OD)(100);*		(Corno):	('m/6rl)		(10 <i>(</i> m²) •		(Tore)	· (Editin [®])-
861-78-6 NA C 5.11E+00 NA 6.00E+04 T 6 10E+03 NA 1.64E+06 T 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		127-18-4	1_	o	-	၁	3.31E+00	NA	6.78E+05		⊢	6.78E+05
106-924 8.00E-02 C 245E-02 C 8.00E-02 NA 1.56E-05 T 6 1.06E-03 R. 1.00E-03 R. 1.	2-Hexanone	591-78-6	ΔN		5.11E+00	nc	5.11E+00	NA	4.09E+04		⊢	4.09E+04
106-93-4 8.73E-03 C 8.24E-03 C 8.73E-03 NA 1.54E+06 T 1	Dibromochloromethane	124-48-1	8.00E-02	o	7.45E-02	၁	8.00E-02	ΝA	6.00E+03		-	6.00E+03
108-907 621E+01 nc 621E+01 nc 621E+01 nd 138E+05 T 1	1.2-Dibromoethane	106-93-4	8.73E-03	ပ	8.24E-03	၁	8.73E-03	NA	1.54E+05		-	1.54E+05
106-61-20-6 C	Chlorobenzene	108-90-7	6.21E+01	2	6.21E+01	nc	6.21E+01	ΝA	1.38E+05		-	1.38E+05
100-41-4 1.06E+03 nc 1.06E+03 NA 5.45E+05 T 5 108-82-3 7.30E+02 nc 7.30E+03 nc 7.30E+02 NA 6.51E+05 T 5 108-42-3 7.30E+02 nc 7.30E+03 nc 7.30E+02 NA 6.51E+05 T 5 108-42-3 1.75E+00 nc 1.04E+03 nc 1.75E+00 NA 6.20E+03 T 5 108-42-3 1.75E+00 nc 1.04E+03 nc 1.75E+00 NA 6.20E+03 T 5 108-42-3 1.75E+00 nc 1.04E+03 nc 1.04E+03 NA 2.0EE+04 T 5 108-42-3 1.30E+02 nc 1.31E-02 nc 1.04E+01 NA 1.04E+01 T 5 108-42-3 1.30E+03 nc 1.31E-03 nc 1.04E+01 NA 1.04E+01 T 5 108-42-3 1.30E+03 nc 2.20E+03 nc 2.20E+04 T 5 108-42-3 2.50E+02 nc 2.20E+03 nc 2.20E+03 NA 3.20E+05 T 5 108-42-3 2.50E+02 nc 2.20E+03 nc 2.20E+03 NA 3.20E+05 T 5 108-42-3 2.50E+02 nc 2.20E+03 nc 2.20E+03 NA 3.20E+05 T 5 108-42-3 2.50E+02 nc 2.20E+03 nc 2.20E+03 NA 3.20E+05 T 5 108-42-3 3.50E+03 nc 2.20E+03 nc 3.20E+04 T 5 108-42-3 3.50E+02 nc 2.20E+03 nc 3.20E+04 T 5 108-42-3 3.50E+02 nc 2.20E+03 NA 3.20E+04 T 7 108-42-3 3.50E+02 nc 2.20E+03 NA 3.20E+04 T 7 120-82-1 2.00E+02 nc 2.20E+02 NA 3.20E+04 T 7 120-82-1 2.00E+02 nc 2.20E+02 nc 2.20E+02 NA 3.20E+04 T 7 120-82-1 2.00E+02 nc 2.20E+02 nc 2.20E+04 NA NA NA NA NA NA NA N	1,1,1,2-Tetrachloroethane	630-20-6	2.60E-01	U	2.41E-01	ပ	2.60E-01	ΝA	5.15E+04		⊢	5.15E+04
106-28-3 7.30E+02 nc 7.30E+03 nc 7.30E+02 NA 6.51E+05 T 6 6 6 6 6 6 6 6 6	Ethylbenzene	100-41-4	1.06E+03	nc	1.06E+03	ည	1.06E+03	ΑN	5.43E+05		닏	5.43E+05
100	m&p-Xylene	108-38-3	7.30E+02	пс	7.30E+03	2	7.30E+02	Ą	6.51E+05		F	6.51E+05
m 100-42-5 1.00E+03 nc 1.00E+03 nc 1.00E+03 nc 1.00E+03 nc 1.00E+03 c 1.15E+06 nc 1.00E+03 nc 1	o-Xvlene	95-47-6	7.30E+02	nc 2	7.30E+03	2	7.30E+02	AN	6.51E+05		T	6.51E+05
mm 75-25-2 1.75E+00 c 16/E+00 c 175E+00 r 4.02E+02 n 2.06E+04 T 7 refrace/loroethane 98-82-8 4.02E+02 n 4.02E+02 n 4.03E+02 n 1 7 <	Styrene	100-42-5	1.06E+03	nc	1.04E+03	ဍ	1.06E+03	2.13E+05			ш	2.13E+05
98-82-8 4,02E+02 nc 4,02E+02 nc 4,02E+02 nc 4,02E+02 nc 3,31E-02 nc 3,31E-02 nc 3,31E-04 nc 1,04E+04	Bromoform	75-25-2	1.75E+00	o	1.61E+00	ပ	1.75E+00	NA	6.20E+03		⊢	6.20E+03
79-34-5 3.31E-02 C 3.31E-02 NA 2.06E+04 T 7 96-18-4 9.61E-04 c 3.13E-03 c 9.61E-04 NA 6.03E+04 T 7 108-86-1 1.04E-01 nc 0.21E-00 NA 1.68E+04 T 7 108-86-1 NA 1.04E+01 nc 0.21E+00 nc 1.66E+02 T 7 108-87-8 6.21E+00 nc 2.56E+02 nc 2.56E+02 NA 1.86E+05 T 7 96-83-9 2.56E+02 nc 2.56E+02 nc 2.56E+02 NA 1.86E+05 T 7 96-83-9 6.21E+00 nc 6.21E+00 NA 1.86E+05 T 7 106-46-7 3.29E+00 nc 6.21E+00 NA 1.86E+05 T 7 106-46-7 3.06E-01 c 3.29E+01 nc 2.09E+02 NA 3.01E+05 T 7 106-46-7	Cumene	98-82-8	4.02E+02	пс	4.02E+02	nc	4.02E+02	NA	2.46E+05		Ţ	2.46E+05
96-18-4 9.61E-04 C 3.13E-03 C 9.61E-04 NA 6.03E+04 T 9 108-86-1 1.04E+01 nc NA 1.04E+04 nc 1.04E+04 NA 4.82E+04 T 7 108-86-1 1.04E+01 nc 6.21E+00 nc 6.21E+00 nc 2.56E+02 T 7 98-83-9 2.56E+02 nc 2.56E+02 nc 2.56E+02 nd 1.04E+05 T 1 96-83-6 6.21E+00 nc 2.56E+02 nc 2.56E+02 nd 1.04E+05 T 1 106-40-7 3.06E-01 nc 2.26E+02 nc 3.29E+00 nd 3.29E+02 T 1 106-40-7 3.06E-01 c 2.86E-02 nc 2.96E+02 nd 3.29E+03 T 106-40-7 3.06E-01 c 2.86E-02 nc 3.06E-01 nd 1 1 106-40-7 3.06E-02 nc 3.29E+0	1.1.2.2-Tetrachloroethane	79-34-5	3.31E-02	O	3.13E-02	ပ	3.31E-02	NA	2.06E+04		⊢	2.06E+04
108-86-1 1.04E+01 nc NA 1.04E+04 NA 4.82E+04 T A A A A A A A A A	1.2.3-Trichloropropane	96-18-4	9.61E-04	U	3.13E-03	υ	9.61E-04	NA	6.03E+04		-	6.03E+04
December Ca22-96-8	Bromobenzene	108-86-1	1.04E+01	2	ΑN		1.04E+01	NA	4.82E+04		-	4.82E+04
Ibenzene 108-67-8 6.21E+00 nc 6.21E+00 nc 6.21E+00 NA 3.68E+05 T 3.58E+05 T 5.56E+02 NA 3.68E+05 T 5.56E+02 NA 3.68E+05 NA	4-Ethyltoluene	622-96-8	ΑN		ΑZ		NA	NA	1.25E+05		⊢	1.25E+05
98-83-9 2.56E+02 nc 2.56E+02 NA NA NA 96-83-6 6.21E+00 nc 6.21E+00 NA 1.80E+05 T 541-73-1 3.20E+00 nc 3.20E+00 nc 3.20E+00 NA 3.61E+04 T 106-46-7 3.0EE-01 c 2.85E-01 c 3.0EE-02 c 3.61E+05 T T 106-46-7 3.0EE-01 c 3.20E+01 c 3.0EE-02 c 3.0EE-02 c 3.0EE-02 T T 106-46-7 3.0EE-02 nc 3.0EE-02 c 3.0EE-02 T<	1.3.5-Trimethylbenzene	108-67-8	6.21E+00	рu	6.21E+00	υc	6.21E+00	NA	3.68E+05		-	3.68E+05
95-63-6 6.21E+00 nc 6.21E+00 nc 6.21E+00 nc 3.29E+00 nc 3.29E+01 c 3.06E-01 c 3.06E-01 nc 3.29E+01 nc 3.06E-02 nc 3.29E+02 nc 3.06E-02	Aloha Methyl Styrene	98-83-9	2.56E+02	υC	2.56E+02	ou.	2.56E+02	NA	NA			A A
541-73-1 3.29E+00 nc 3.29E+00 nc 3.29E+00 nc 3.29E+00 NA 3.61E+04 T 3.61E+04 T T 3.61E+04 T T 4.61E+05 T 4.61E+05 T 4.61E+05 T 4.61E+05 T	1,2,4-Trimethylbenzene	95-63-6	6.21E+00	nc	6.21E+00	nc	6.21E+00	NA	1.80E+05		-	1.80E+05
106-46-7 3.06E-01 c 2.85E-01 c 3.06E-01 c 3.06E-02 n 3.01E-03 T E T 67-72-1 4.80E-01 c 4.47E-01 c 4.80E-02 n 2.08E+02 n 1	1.3-Dichlorobenzene	541-73-1	3.29E+00	DC	3.29E+00	uc	3.29E+00	NA	3.61E+04		⊢	3.61E+04
100-44-7 3.96E-02 c 3.68E-02 c 3.68E-02 c 3.96E-02 c 3.06E+03 5.17E+03 E 95-50-1 2.09E+02 nc 3.29E+01 nc 2.09E+02 NA 3.01E+05 T 67-72-1 4.80E-01 c 4.47E-01 c 4.80E-01 NA 17 87-68-3 8.73E-02 c 8.03E+02 nc 2.08E+02 NA 3.71E+04 T 87-68-3 8.73E-02 c 8.03E+02 nc 2.08E+02 NA 3.71E+04 T 74-82-8 NA NA NA NA NA NA NA 74-85-1 NA NA NA NA NA NA NA NA 74-86-2 NA NA NA NA NA NA NA NA 74-86-3 NA NA NA NA NA NA NA 74-86-3 NA NA NA	1.4-Dichlorobenzene	106-46-7	3.06E-01	ပ	2.85E-01	၁	3.06E-01		6.61E+05		F	6.61E+05
95-50-1 2.09E+02 nc 3.29E+01 nc 2.09E+02 NA 3.01E+05 T 67-72-1 4.80E-01 c 4.80E-01 NA 2.90E+04 T 120-82-1 2.08E+02 nc 2.08E+02 nc 2.08E+02 NA 3.71E+04 T 87-68-3 8.73E-02 c 8.03E-02 c 8.73E-02 3.21E+04 3.20E+04 T 74-82-8 NA NA NA NA NA NA T 74-85-1 NA NA NA NA NA NA NA 74-86-2 NA NA	Benzyl Chloride	100-44-7	3.96E-02	O	3.68E-02	၁	3.96E-02				ш	5.20E+03
67-72-1 4.80E-01 c 4.47E-01 c 4.80E-01 NA 2.90E+04 T 120-82-1 2.08E+02 nc 2.08E+02 nc 2.08E+02 NA 3.71E+04 T 87-68-3 8.73E-02 c 8.73E-02 c 8.73E-02 T T 74-82-8 NA NA NA NA NA NA T 74-86-2 NA NA NA NA NA NA NA 74-86-2 NA NA NA NA NA NA T 115-07-1 NA NA NA NA NA NA NA 74-98-6 NA NA NA NA NA NA T 80e) 74-98-6 NA NA NA NA NA T 80e) 74-98-6 NA NA NA NA NA T 80e) 74-99-7 NA NA <	1.2-Dichlorobenzene	95-50-1	2.09E+02	пс	3.29E+01	bu	2.09E+02	NA	3.01E+05		-	3.01E+05
120-82-1 2.08E+02 nc 2.08E+02 nc 2.08E+02 nc 3.71E+04 T 87-68-3 8.73E-02 c 8.03E-02 c 8.73E-02 3.21E+04 T T 87-68-3 8.73E-02 c 8.03E-02 c 8.73E-02 3.20E+04 E 74-82-8 NA NA NA NA NA T 74-86-2 NA NA NA NA NA NA 115-07-1 NA NA NA NA NA NA 74-98-6 NA NA NA NA NA NA 74-98-6 NA NA NA NA NA NA 74-98-6 NA NA NA NA NA T 8ne) 74-98-6 NA NA NA NA NA	Hexachlorethane	67-72-1	4.80E-01	O	4.47E-01	ပ	4.80E-01	NA	2.90E+04		-	2.90E+04
87-68-3 8.73E-02 c 8.03E-02 c 8.73E-04 a.20E+04 E 74-82-8 NA NA NA NA NA T 74-86-2 NA NA NA NA NA T 115-07-1 NA NA NA NA NA NA 74-98-6 NA NA NA NA NA NA 74-98-6 NA NA NA NA NA NA 74-98-6 NA NA NA NA NA T 8ne) NA NA NA NA T	1.2.4-Trichlorobenzene	120-82-1	2.08E+02	DU.	2.08E+02	วน	2.08E+02	Ą	3.71E+04		-	3.71E+04
74-82-8 NA NA NA NA T-80E+06 T 74-85-1 NA NA NA NA T T 74-86-2 NA NA NA NA NA NA NA 115-07-1 NA NA NA NA NA NA T 74-98-6 NA NA NA NA NA T 74-99-7 NA NA NA NA NA T	Hexachlorobutadiene	87-68-3	8.73E-02	O	8.03E-02	၁	8.73E-02	3.21E+04	_		ш	3.21E+04
74-82-8 NA NA NA NA T 74-82-8 NA NA NA NA NA T 74-86-2 NA NA NA NA NA NA NA 74-86-2 NA NA NA NA NA NA NA 115-07-1 NA NA NA NA NA NA T 74-98-6 NA NA NA NA NA NA T 74-99-7 NA NA NA NA NA NA T												
74-82-8 NA NA NA 3.30E+06 T 74-85-1 NA NA NA A.60E+05 T 74-86-2 NA NA NA NA NA 74-84-0 NA NA NA NA NA 115-07-1 NA NA NA NA T 74-98-6 NA NA NA NA T 74-98-7 NA NA NA NA T 74-99-7 NA NA NA NA NA T	Hydrocarbons										ļ	100
74-85-1 NA NA NA 4.60E+05 T 74-86-2 NA NA NA NA NA 74-84-0 NA NA NA NA NA 115-07-1 NA NA NA NA NA 74-98-6 NA NA NA NA T 74-99-7 NA NA NA NA T	Methane	74-82-8	ΑΝ		ΥN		NA	₹	3.30E+06		- -	3.30E+06
74-86-2 NA NA <t< td=""><td>Ethylene</td><td>74-85-1</td><td>NA</td><td></td><td>NA</td><td></td><td>AA</td><td>¥</td><td>4.60E+05</td><td></td><td>-</td><td>4.60E+05</td></t<>	Ethylene	74-85-1	NA		NA		AA	¥	4.60E+05		-	4.60E+05
74-84-0 NA NA <t< td=""><td>Acetylene</td><td>74-86-2</td><td>ΑN</td><td></td><td>NA</td><td></td><td>NA A</td><td>AA</td><td>¥</td><td></td><td></td><td>ĕZ</td></t<>	Acetylene	74-86-2	ΑN		NA		NA A	AA	¥			ĕ Z
115-07-1 NA NA NA NA NA T NA NA NA NA NA T T T T T T NA NA </td <td>Ethane</td> <td>74-84-0</td> <td>ξ</td> <td></td> <td>ΑN</td> <td></td> <td>NA</td> <td>NA</td> <td>¥</td> <td></td> <td></td> <td>¥N</td>	Ethane	74-84-0	ξ		ΑN		NA	NA	¥			¥N
74-98-6 NA NA NA 3.78E+06 T T T T T T T T T T T T T T T T T T T	Propylene	115-07-1	NA		AN		A A	¥	₹			V I
) 74-99-7 NA NA 2.79E+06 T	Propane	74-98-6	NA		Ϋ́		Ϋ́	₹	3.78E+06		- -	3.78E+06
	Propyne (methyl acetylene)	74-99-7	NA		A		ΑN	¥	2.79E+06		-	2.79E+06

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

Compound:	CAS#	PRG		RBC	Endpoint		(इस्ट)		AEGL	2.2	4.5
		*(ing/m³)	12. 24.5	*(flg/m³)	(outlous)	(sur/6ft)*	((ug/m³))*	s(tigint))	(jugina):	(TorE)	=((ng/m))=
	75-28-5	AN		NA		AN	NA	9.52E+05		L	9.52E+05
1-Butene/Isobutylene (115-11-7)	106-98-9	Ą		Ą		NA	NA	6.87E+06		<u></u>	6.87E+06
1 3-Butadiene/hutane	106-99-0	3.74E-03	O	3.48E-03	၁	3.74E-03	2.20E+04	2.21E+04		ш	2.20E+04
ris-butana	25167-67-3	ΑZ		Ą		AN	NA	1.72E+04	¥	F	1.72E+04
d-Button	107-00-6	ΑX		ΨN		ΑN	NA	NA			ΨZ
trans-Butene	25167-67-3	¥		ΝΑ		ΝΑ	NA	1.72E+04	ΑA	⊢	1.72E+04
9-Rutyne (crotonylene)	503-17-3	ΑΝ		ΑΝ		NA	AA	Ϋ́			¥ V
n-Pentane	109-66-0	¥		NA		ΝA	ΑN	1.80E+06		<u>-</u>	1.80E+06
n-Hexane	110-54-3	2.10E+02	nc	2.08E+02	nc	2.10E+02	¥	5.28E+05			5.28E+05
SVOCS											0.101
n-nitrosodimethylamine	62-75-9	1.37E-04	υ	1.23E-04	ပ	1.37E-04	₽	2.50E+03		-	Z.50E+03
bis(2-chloroethyl)ether	111-44-4	5.82E-03	ပ	5.69E-03	O	5.82E-03	∀ N	5.85E+04		_	3.83E+04
phenoi	108-95-2	2.19E+03	nc	2.19E+03	ပ	2.19E+03	¥	3.85E+04		-	3.85=+04
2-chlorophenol	95-57-8	1.83E+01	<u>ا</u>	1.83E+01	nc	1.83E+01	¥	5.25E+03			5.25E+03
3-Dichlorobenzene	541-73-1	3.29E+00	2	3.29E+00	uc	3.29E+00	¥	3.61E+04		-	3.61E+04
4-dichlorobenzene	106-46-7	3.06E-01	O	2.85E-01	2	3.06E-01	¥	6.61E+05		_	6.61E+05
2-dichlorobenzene	95-50-1	2.09E+02	2	3.29E+01	ou	2.09E+02	¥	3.01E+05			
henzyl alcohol	100-51-6		22	1.10E+03	bu	1.10E+03	¥	5.53E+04		-	5.53E+04
bis/2-chloroisopropyl)ether	108-60-1	1.92E-01	υ	1.79E-01	၁	1.92E-01		6.99E+04		-	6.99E+04
2-methylphenol	95-48-7	1.83E+02	nc	1.83E+02	วน	1.83E+02		¥			∀ N
hexachloroethane	67-72-1	4.80E-01	O	4.47E-01	υ	4.80E-01		2.90E+04		-	2.90E+04
n-nitroso-di-n-propylamine	621-64-7	9.61E-04	o	8.94E-04	ს	9.61E-04	ΑN	2.00E+02		-	2.00E+02
4-methylphenol	106-44-5	1.83E+02	ည	1.83E+02	nc	1.83E+02	¥	ΨZ			AN I
nitrohenzene	98-95-3	2.09E+00	2	2.19E+00	nc	2.09E+00	¥	1.51E+04			1.51E+04
isophorone	78-59-1	7.08E+00	υ	6.59E+00	ပ	7.08E+00	Ϋ́	2.83E+04		-	2.83E+04
2-nitrophenol	88-75-5	ΑN		ΑN		NA	ΑN	ĄZ			Y Y
2 4-dimethylphenol	105-67-9	7.30E+01	ည	7.30E+01	nc	7.30E+01	₹	₹			₹ Z
bis(2-chloroethoxv)methane	111-91-1	ΨN		ΑN		Ϋ́	¥	¥		ا	AN I
2 4-dichlorophenol	120-83-2	1.10E+01	ဥ	1.10E+01	nc	1.10E+01	¥	3.00E+04		-	3.00E+04
1 2 4-trichlorobenzene	120-82-1	2.08E+02	ည	2.08E+02	nc	2.08E+02		3.71E+04			3.71E+04
nanhthalana	91-20-3	3.13E+00	ဥ	3.29E+00	uc	3.13E+00		7.86E+04			7.86E+04
4-chloroaniine	106-47-8	1.46E+01	2	1.46E+01	nc	1.46E+01	¥	_		-	3.00E+04
hexachlorobitadiene	87-68-3	8.62E-02	O	8.03E-02	၁	8.62E-02	3.21E+04	_		ш	3.21E+04
4-chloro-3-methylphenol	59-50-7			NA		AN		2.00E+04		- -	2.00E+04
2-methylnaphthalene	91-57-6	¥		7.30E+01	nc	7.30E+01		2.00E+04			2.00E+04
Z-IIIoury indpire describ		30 1		-		7007	414	COLLICO C		<u>-</u>	つつ つかはすしつ

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

				1000		LIBOUR		MATERIAL PARTY	AFG!	Source	ATIV.
S	CAS#	((mo(m²));		((((((((((((((((((((coupo);		(illight)	PACE T		(Tole)	: (سۆرىيى) ئىزىلىقىلىلىلىلىلىلىلىلىلىلىلىلىلىلىلىلىل
€ α	88-06-2	1 10F+02	nc	1.10E+02	nc	1.10E+02	ΑN	3.00E+04		T	3.00E+04
ضاد	95-95-4	3.65E+02	nc DC	3.65E+02	ວເ	3.65E+02	NA	3.00E+04		⊢	3.00E+04
בוי	91-58-7	2.92E+02	nc	2.92E+02	JU	2.92E+02	NA	6.00E+02		⊢	6.00E+02
1 ***	88-74-4	2.09E-01	ဥ	2.08E-01	uc	2.09E-01	Ϋ́Z	NA NA			ΑN
	208-96-8	ΑN		NA		ΝΑ	AN	2.00E+02		-	2.00E+02
	131-11-3	3.65E+04	nc	3.65E+04	၁ပ	3.65E+04	AN	1.50E+04		-	1.50E+04
	606-20-2	3.65E+00	วน	3.65E+00	nc	3.65E+00	¥	6.00E+02		-	6.00E+02
	83-32-9	2.19E+02	bu	2.19E+02	ည	2.19E+02	AM	1.25E+03		-	1.25E+03
	99-09-2	Ϋ́		NA		Ϋ́	¥	A V			AN I
	51-28-5	7.30E+00	nc	7.30E+00	nc	7.30E+00	¥	7.50E+03		-	7.50E+03
	132-64-9	1.46E+01	ou	1.46E+01	nc	1.46E+01	¥	Ϋ́			Ą
111	121-14-2	7.30E+00	ည	7.30E+00	uc	7.30E+00	ΑN	6.00E+02			6.00E+02
10	100-02-7	2.92E+01	υC	2.92E+01	nc	2.92E+01	Ą	3.00E+04		-	3.00E+04
ı≍	86-73-7	1.46E+02	ဥ	1.46E+02	uc	1.46E+02	Ϋ́	7.50E+04		_	7.50E+04
ı≍	7005-72-3	AN		ΑN		NA	Ϋ́	Ϋ́			Ą
12	84-66-2	2.92E+03	ည	2.92E+03	uc	2.92E+03	ΑN	1.50E+04		-	1.50E+04
10	100-01-6	AN		NA		A'A	AN	9.00E+03		-	9.00E+03
165	534-52-1	Ą		3.65E-01	uc	3.65E-01	A	5.00E+02			5.00E+02
lm	86-30-6	1.37E+00	O	1.28E+00	υ	1.37E+00	NA	Ϋ́			∀ Z
1-	101-55-3	AN		AN		NA	ΑN	A A			ΔN
	118-74-1	4.18E-03	U	3.91E-03	၁	4.18E-03	Ą	7.50E+01		-	7.50E+01
	87-86-5	5.60E-02	υ	5.22E-02	ပ	5.60E-02	Ą	1.50E+03		-	1.50E+03
1	85-01-8	ΑΝ		ΑN		ΝΑ	¥	2.00E+03			2.00E+03
	120-12-7	1.10E+03	20	1.10E+03	nc	1.10E+03	¥	6.00E+03		-	6.00E+03
	84-74-2	3.65E+02	ည	3.65E+02	nc	3.65E+02	N A	1.50E+04		-	1.50E+04
	206-44-0	1.46E+02	ဥ	1.46E+02	ou	1.46E+02	NA	3.00E+01		-	3.00E+01
	129-00-0	1.10E+02	20	1.10E+02	JC	1.10E+02	NA	1.50E+04		<u>-</u>	1.50E+04
	85-68-7	7.30E+02	ည	7.30E+02	၁ပ	7.30E+02	NA	5.00E+05		-	5.00E+05
	56-55-3	2 17E-02	٥	8.58E-03	٥	2.17E-02	NA	6.00E+02		_	6.00E+02
	218-01-9	2.17E+00	O	8.58E-01	o	2.17E+00	NA	2.00E+02		-	2.00E+02
	91-94-1	1.50E-02	O	1.39E-02	O	1.50E-02	NA	6.21E+03		-	6.21E+03
	117-81-7	4.80E-01	o	4.47E-01	ပ	4.80E-01	NA	1.00E+04		-	1.00E+04
	117-84-0	7.30E+01	ည	7.30E+01	nc	7.30E+01		1.50E+05		-	1.50E+05
104	205-99-2	2.17E-02	o	8.58E-03	ပ	2.17E-02	AM	A A			∀
	207-08-9	2.17E-01	υ	8.58E-02	ပ	2.17E-01	₹	ΑN			AN S
						LITTO	< -	1	_	<u>-</u>	7 507 103

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Appendix C: Health-Based Screening Levels and Acute Toxicity Values

indeno(1,2,3-cd)pyrene		u.	14	CANADA CONTRACTOR							
Ž.	7886.2	*(_m/bn)	* (COL 10 C)	(/ju/jb/)	າ(ວຸດເກດ)	(40/60)	(hg/m³)*	(ng/m _s)	(ug/m)	(Tor E)	, (jig/m³)
-cu/pyreire	103-30-5	2 17E-02	1	I	ပ	10	NA	NA			NA
dibenz(a h)anthracene	L	2.17E-03	O	8.58E-04	ပ	2.17E-03	ΑN	3.00E+04		-	3.00E+04
benzo(g,h,i)perylene	ll	ΑĀ		¥		ΝΑ	AA	3.00E+04		-	3.00E+04
TO-13 (PAHS)				20.		2 125100	S Z	7 86 E+04		-	7 86F+04
	91-20-3	3.13E+00	22	3.29=+00	JC	3.135100	5 5	2 00 = 104		- -	2 OOF +02
acenaphthylene	208-96-8	¥		¥ N		AN L	₹ :	4.055.02		- -	1 255-103
Acenaphthene	83-32-9	2.19E+02	nc	2.19E+02	ည	2.19E+02	₹ S	1.25E+03		- -	7 50E+04
	86-73-7	1.46E+02	ည	1.46E+02	nc	1.40=+02	¥	7.3001-04		-	2 OOF +03
phenanthrene	85-01-8	NA		ΝΑ		AN.	¥.	2.00E+03		- -	SOL 100.2
	120-12-7	1.10E+03	nc	1.10E+03	ည	1.10E+03	₹	6.00E+03		- +	0.00
	206-44-0	1.46E+02	22	1.46E+02	nc	1.46E+02	NA V	3.00E+01		-	3.00E+01
	129-00-0	1.10E+02	20	1.10E+02	nc	1.10E+02	ΑN	1.50E+04		-	1.50E+04
pyrene henzo(a)anthracene	56-55-3	2.17E-02	O	8.58E-03	U	2.17E-02	ΝA	6.00E+02		-	6.00E+02
	218-01-9	2.17E+00	o	8.58E-01	ပ	2.17E+00	NA	2.00E+02		-	2.00E+02
on years	205-99-2	2.17E-02	O	8.58E-03	O	2.17E-02	NA	A A			Ą.
Derizo(b)increminent	207-08-9	2.17E-01	υ	8.58E-02	ပ	2.17E-01	NA	NA			≸:
000	192-97-2	ΑN		ΝA		AN	A	Y Y	ΑN		Y V
Delizo(e)pytene	50-32-8	2.17E-03	U	2.02E-03	O	2.17E-03	NA	7.50E+03			7.50E+03
perizo(a)pyrefie	193-39-5	2.17E-02	U	8.58E-03	O	2.17E-02	NA	NA			₹Z
cu/pyrene	53-70-3	2 17E-03	C	8.58E-04	O	2.17E-03	ΑA	3.00E+04		-	3.00E+04
dipenz(a,ri)anumacene	191-24-2	AN AN		A'N		ΑN	ΑN	3.00E+04		⊢	3.00E+04
Delizo(g,n,r)peryvene											
DIOXIIIS AND FUTAILS	1748 01 B	A ARE DR	٥	4 17F-08	U	4.48E-08	ΑN	3.50E+00		_	3.50E+00
2378-Tetrachlorodibenzo-p-dioxin	40321-76-4	NA NA		¥Z		₹	ΑN	2.50E+00		⊥	2.50E+00
12378-Periacinologiberizo-p-dioxin	30277-28-6	ΔN		Ą		ΑN	AN	AN			A A
123478-Hexaciliologice izo-p-dioxiii	576E3 86 7	VIV.		ΔN		¥	¥	1.50E+01		⊢	1.50E+01
23678-Hexachlorodiberizo-p-dioxin	10408 74 3	1 48E-06	c	138E-06	U	1.48E-06	¥	ΑN			A A
123789-Hexachiorodiperizo-p-dioxili	25022 46 0			ΔN		ΑN	¥	Ą			ΝA
1234678-Heptachiorodibelizo-p-dioxili	2268 87 0	ζ. V.		AN AN		Ϋ́	¥	1.50E+02		-	1.50E+02
Octachlorogiperizo(p)dioxiii	54207 24 0	Z Z		ΑN		ž	¥	2.00E+00		⊢	2.00E+00
2378-1 etrachiorodibenzo-p-lurari	E7447 44 E			AN		ž	¥	Ą			NA
123/8-Pentachlorodiberizo-p-iulari	57117-31-A			AN		¥	¥	7.50E-02		⊢	7.50E-02
23478-Pentachiorouiberizo-o-furail	70648 26 0			ΑN		Ϋ́	¥	7.50E+00		_	7.50E+0C
1234/8-Hexachiorogipenzo-p-turali	F7117-44-0			ΑN		ΑN	¥	2.50E+00		Τ	2.50E+00
1236/8-hexachlorodiberizo-p-lulari	70040 24 0			ΔN		Ϋ́	¥	ΑN			NA

Appendix C: Health-Based Screening Levels and Acute Toxicity Values

Company	#SVO		Toxicity Endpoint		Toxicity Endpolin	ISB:	EKPIG	15 0 15 0	√E6L	Source	ŽĮ,
		(,w/br/) _%	် (၁၀၃၀)	(iúg/m²).≰	X(clor.nc)	(hg/mis)	(III) (III) (I	*(1,0000)	(hg/me)		Can grant
234678-Hexachlorodibenzo-o-furan	60851-34-5	¥		ΑN		ΑN	NA	1.50E+00		⊢	1.50E+00
1234678-Hentachlorodibenzo-p-furan	67562-39-4	₹Z		₹Z		ΑN	NA	NA			NA
1234789-Heptachlorodibenzo-p-furan	55673-89-7	Ϋ́		Ϋ́Z		AN	NA	NA			NA
Octachlorodibenzofuran	39001-02-0	ΑN		ΑN		NA	Ν	3.00E+02		⊢	3.00E+02
Energetics											
Nitrobenzene	98-95-3	2.09E+00	ည	2.19E+00	nc	2.09E+00	NA	1.51E+04		-	1.51E+04
2-Nitrotoluene	88-72-2	3.65E+01	ည	3.65E+01	nc	3.65E+01	NA	NA			A A
3-Nitrotoluene	99-08-1	3.65E+01	2	7.30E+01	20	3.65E+01	NA	NA			Ϋ́
4-Nitrotoluene	0-66-66	3.65E+01	20	3.65E+01	20	3.65E+01	NA	3.37E+04		-	3.37E+04
Nitroalycerine	55-63-0	4.80E-01	O	4.47E-01	O	4.80E-01	NA	NA			A A
1 3-Dinitrohenzene	99-62-0	3.65E-01	nc	3.65E-01	20	3.65E-01	NA	3.00E+03		⊢	3.00E+03
2.6-Dinitrotoluene	606-20-2	3.65E+00	20	3.65E+00	nc	3.65E+00	NA	6.00E+02		-	6.00E+02
2 4-Dinitrotoluene	121-14-2	7.30E+00	рu	7.30E+00	nc	7.30E+00	NA	6.00E+02	ΑN	⊢	6.00E+02
1.3.5-Trinitrobenzene	99-35-4	1.10E+02	nc	1.10E+02	nc Dr	1.10E+02	NA	3.00E+04		⊢	3.00E+04
2.4.6-Trinitrotoluene	118-96-7	2.24E-01	O	2.09E-01	ပ	2.24E-01	NA	2.50E+04		-	2.50E+04
RDX	121-82-4	6.11E-02	٥	5.69E-02	ပ	6.11E-02	NA	NA			ΑN
4-Amino-2.6-Dinitrotoluene	19406-51-0	ΑN		ΑN		NA	NA	Ϋ́			Ą.
2-Amino-2 6-Dinitrotoluene	35572-78-2	Ϋ́		ΑN		ΑN	NA	1.50E+04		⊢	1.50E+04
Teirvi	479-45-8	3.65E+01	JC	3.65E+01	nc	3.65E+01	NA	NA			A A
HMX	2691-41-0	1.83E+02	ည	1.83E+02	υC	1.83E+02	NA	NA			A V
Pentaerythritoltetranitrate	78-11-5	Ϋ́N		ΨZ		NA	NA	5.00E+01		⊢	5.00E+01
Dibutyl Phthalate	84-74-2	3.65E+02	nc	3.65E+02	ე <u>.</u>	3.65E+02	AN	1.50E+04		-	1.50E+04
Dioctyl Phthalate	117-81-7	4.80E-01	O	4.47E-01	ပ	4.80E-01	ΑN	1.00E+04		F	1.00E+04
Diphenylamine	122-39-4	9.13E+01	2	9.13E+01	2	9.13E+01	ΝA	3.00E+04		F	3.00E+04
Footnotes:											

PRG = Preliminary Remediation Goals

c = cancer

nc = non-cancer

RBC = Risk-Based Concentration

HBSL = Health-Based Screening Level

(E) ERPG = Emergency Response Planning Guidelines

(T) TEEL = Temporary Emergency Exposure Limits (A) AEGL = Acute Exposure Guideline Level

ATV = Acute Toxicity Value

NA = Not Available

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APPENDIX D RISK ASSESSMENT DATA

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 100 meter location

			Cartridge,	0.50 D	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	, M17 (M2)			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	Maximum Concentration (µg/m³)	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 12
Permanent Gases						00.100	1757.04	7 765 00	3
Ammonia (NH3)	1.67E+01	1.04E+02	1.60E-01	2	1.36E+03	1.36E+03	1.75E+04	7.70=-02	2
Carbon Dioxide (CO2)	4.34E+02	N		na	1.41E+05	1.41E+05	5.40E+07	2.61E-03	2
Carbon Monoxide (CO)	8.34E+02	1.00E+04	8.34E-02	ou	6.77E+04	6.77E+04	2.30E+05	2.94E-01	2
Oxides of Nitroden (as NO)	3.67E+01	1.00E+02	3.67E-01	no	1.19E+04	1.19E+04	3.08E+04	3.87E-01	2
Sulfur Dioxide (SO2)	2.16E-01	8.00E+01	2.70E-03	2	1.75E+01	1.75E+01	7.89E+02	Z.ZZE-0Z	2
Acid Gases						414	1 605±03		2
Hydrogen fluoride	NA	N		g		¥ :	1.000-103		2 2
Hydrogen chloride	NA	2.08E+01		na		ΨZ :	4.50E+03		2 2
Hydrogen bromide	ΑN	۸N		na		¥Z.	9.93E+03		<u>a</u>
Nitric Acid	ΑN	ΛN		na		∀	1.30E+03		2 2
Phosphoric acid	ΑN	1.04E+01		na		AN A	3.00E+03	1,,,,	19
Sulfuric Acid	3.55E-01	N		na	2.88E+01	2.88E+01	2.00E+03	1.44E-02	2
Cyanide						1	20.100	2 505 02	3
Particulate Cyanide	5.39E-01	7.30E+01	7.38E-03	2	1.75E+02	1.75=+02	3.000	3.30E-02	2 2
Hydrogen Cyanide	6.69E+00	3.13E+00	2.14E+00	yes	2.17E+03	2.17=+03	5.17=+03	4.20E-01	T
Particulates					00.	2 555+03	SZ		6
Total Suspended Particulate	3.14E+01	5.00E+01	6.28E-01	2	Z.33E+U3	2.335+03	Z V		e C
PM10	2.88E+01	5.00E+01	5.76E-01	2	7.34E+U3	4 265+03	S VI		2
PM2.5	1.68E+01	1.50E+01	1.12E+00	yes	1.30=+03	1.305-103	5		2
Metals		1	20,	1	2 486±04	2 16E±01	3 00F+04	7.19E-04	2
Aluminum	6.65E-02	5.11E+00	1.30E-02	2	4 70E+01	4 70E±02	1 50E+03	1 13E-01	2
Antimony	5.24E-01	1.46E+00	3.59E-01	2 2	1.705.702	NAN	3.00E+01		па
Arsenic	NA 0 10E 01	5.24F=04	1 57E+00	ves	2.66E+02	2.66E+02	1.50E+03	1.77E-01	٤
Barium	0.13C-01	8 00F-04		na		¥	5.00E+00		na
Berymurn	42	1.07E-03		na		Ν	3.00E+01		na
Cadimum	2 ARE-01	2		na	8.65E+01	8.65E+01	3.00E+04	2.88E-03	2
Calcium	NA NA	1 53E-04		na		NA	1.50E+03		na
Cilolidai	AN	2.20E+02		na		NA	6.00E+01		na
Condit	1 02E+01	1.46E+02	6.97E-02	2	3.30E+03	3.30E+03	3.00E+03	1.10E+00	yes
bea	1.06E+00	1.50E+00	7.07E-01	ou	3.44E+02	3.44E+02	1.50E+02	2.29E+00	yes
Managarina	2 10F-01	2		na	6.82E+01	6.82E+01	3.00E+04	2.2/E-03	2
Managaga	AN	5.11E-02		na		Ϋ́	3.00E+03		na
Nickel	AN	7.30E+01		na		Ϋ́	3.00E+03		g
Michel	ΔN	1 83E+01		па		ΑN	6.00E+02		na
Selenium	5	.,							

D-2

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 100 meter location

) D	DODIC: A571				
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} / HBSL	> 1?	Maximum Concentration (µg/m³)	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
Silver	Ϋ́Z	1.83E+01		g		ΑN	3.00E+02		na
Thallium	ΔZ	2.56E-01		na		NA	3.00E+02		na
Vanadium	ĄZ	2.56E+01		na		NA	1.50E+02		В
Zinc	1.68E+00	1.10E+03	1.53E-03	2	5.44E+02	5.44E+02	3.00E+04	1.81E-02	2
TO-11 Carbonyls								1	
Formaldehyde	9.74E-03	1.48E-01	6.59E-02	2	1.84E+00	1.84E+00	1.23E+03	1.50E-03	임
Acetaldehyde	NA	8.73E-01		na		NA	1.80E+04		ם
Acetone	ΑN	3.65E+02		na		ΑN	2.37E+06		шg
Acrolein	ΑN	2.09E-02		na		ΝΑ	2.30E+02		na
Proprionaldehyde	ΑN	2		na		AA	7.50E+04		2
Crotonaldehyde	ĄN	3.54E-03		na		ΝΑ	5.72E+03		В
Butyraldehyde	ΑN	N		na		NA	7.38E+04		Ba
Benzaldehyde	ΑN	3.65E+02		na		NA	1.50E+04		g
sovaleraldehyde	ΑN	N		na		NA	AA		g
Valeraldehyde	ΑN	N		na		NA	Ϋ́		g
o,m,p-Tolualdehyde	NA	N		na		NA	AN		g
Hexaldehyde	NA	N		na		NA	NA		na
2,5-Dimethylbenzaldehyde	NA	NV		na		AA	AN		E S
VOCs									
Propene	5.45E-02	N		na	4.42E+00	4.42E+00	AN		g
Dichlorodifluoromethane	AN	2.09E+02		na		NA	1.48E+07		па
Chlorodifluoromethane	NA	5.11E+04		na		ΑΝ	4.41E+06		a
Freon 114	NA	N/		na		₹	2.10E+07	100	g
Chloromethane	1.44E-04	1.07E+00	1.35E-04	2	1.09E-01	1.09E-01	2.06E+05	5.30E-07	2
Vinyl Chloride	NA	2.20E-02		na		Y.	1.28E+04	10101	<u> </u>
1,3-Butadiene	5.25E-03	3.74E-03	1.41E+00	yes	9.94E-01	9.94E-01	2.20E+04	4.52E-05	2
Bromomethane	NA	5.21E+00		na		ΨN	5.82E+04		Ē
Chloroethane	NA	2.32E+00		na		ΑN	2.64E+06		E
Dichlorofluoromethane	AN	2.09E+02		na		AN	1.48E+07		밀
Trichlorofluoromethane	1.69E-04	7.30E+02	2.32E-07	no	5.49E-02	5.49E-02	2.81E+06	1.96E-08	일
Pentane	8.19E-04	N/		na	2.66E-01	2.66E-01	1.80E+06	1.48E-07	일
Acrolein	₹	2.09E-02		na		Ϋ́	2.30E+02		g
1,1-Dichloroethene	NA	5.21E+02		na		A V	7.92E+04		пa
Freon 113	AN	3.13E+04		na		Ϋ́	9.58E+06		Вп
Acetone	8.37E-02	3.65E+02	2.29E-04	no	2.71E+01	2.71E+01	2.37E+06	1.15E-05	2
		,				-		_	2

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 100 meter location

	2		Cartridge	0.50 D(Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	, M17 (M2)			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	Maximum Concentration (µg/m³)	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
	٩N	7.30F+02		па		AN	3.11E+04		Б
Varbon Disulide	8.35E-02	6.20E+01	1.35E-03	2	2.71E+01	2.71E+01	1.01E+05	2.69E-04	2
2 Objections	AN	1.04E+00		na		NA	9.39E+03		na
Methylene Chloride	3.93E-02	4.09E+00	9.60E-03	ou	7.43E+00	7.43E+00	6.96E+05	1.07E-05	2
tert-Butyl Alcohol	AN	N		na		Ą	4.55E+05	701.05	g g
Acryonitrile	7.72E-03	2.83E-02	2.73E-01	2	1.46E+00	1.46E+00	2.17E+04	P. / 3E-U3	2 2
trans-1,2-Dichloroethene	NA	7.30E+01		na		¥ Z	4.95E+04		2 2
Methyl t-Butyl Ether	AN	3.13E+03		na		¥ .	4.32E+U3		2 2
Hexane	ΑN	2.09E+02		na		₹ S	3.20E+U3		2 2
1.1-Dichloroethane	ΝΑ	5.21E+02		na		¥Z	1.215+00		0 0
Vinyl Acetate	ΑN	2.09E+02		Б		¥.	7.025+04		2 2
cis-1.2-Dichloroethene	NA	3.65E+01		na		¥Z.	CO+176.7		2 2
2-Butanone	ΑN	1.04E+03		па		NA P	6.83E+U3	2 225 06	2 2
Ethyl Acetate	9.90E-03	3.29E+03	3.02E-06	2	3.21E+00	3.21E+00	1.44E+U0	Z.Z.SE-U0	
Methyl Acrylate	ΑN	1.10E+02		na		¥.	NA Par o		2 2
Chloroform	ΝΑ	8.35E-02		na		AA	9.76E+03	101	2 2
4 1 1-Trichloroethane	3.74E-04	1.04E+03	3.59E-07	no	3.03E-02	3.03E-02	1.94E+06	1.56E-U8	2 2
Carbon Tetrachloride	ΑN	1.28E-01		na		ΨN.	1.28=+05	0.051	<u>a</u>
1 2-Dichloroethane	2.40E-03	7.39E-02	3.25E-02	ဥ	1.82E+00	1.82E+00	8.08=+03	4.405.04	
Benzene	1.23E-01	2.49E-01	4.93E-01	2	2.33E+01	2.33E+01	1.56=+05	1.49E-04	2 2
Isooctane (2.2.4-trimethylpentane)	AN	N		na		₹ Z	3.50E+05		2 2
Hentane	ΑŽ	N		na		₹ Z	1.80E+06		<u>a</u>
Trichloroethane	Ϋ́Z	1.04E+03		па		ĕ	1.94E+06		2 2
Ethyl Acrylate	AN A	1.40E-01		na		¥.	7 0014		2 2
1.2-Dichloropropane	N A N	9.89E-02		na		₹ S	3.066+03		2 0
Methyl Methacrylate	AN	7.30E+02		na		4 4	2 50E+05		2 6
Dibromomethane	₹	3.65E+01		la La		S A	9 00F+04		Ba
1,4-Dioxane	AN.	6.11E-01		<u>a</u>		₹ Z	4.00E+03		na
Bromodichloromethane	¥.	1.08E-01		<u> </u>		₹	3.07E+05		na
4-Methyl-2-Pentanone	AN I	104140.0	100 0	3 2	2 635+00	2 63F+00	1.88E+05	1.41E-05	ou
Toluene	3.25E-02	4.02E+02	0.09E-03	2 2	20.700.7	AN AN	₹ Z		na
Octane	AN S	NV F 47E 00		2 2		Ž	AN AN		na
trans-1,3-Dichloropropene	ΔZ.	3.175-02		2 2		AN V	ĄN		na
Ethyl Methacrylate	ΨZ.	3.29E+02		2 2		¥	1.64E+05		na
1,1,2-Trichloroethane	¥ .	2 245-01		2 2		Ž	6.78E+05		na
Tetrachioroethene	NA NA	0.011.00		1					

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 100 meter location

			Cartridge,	0.50 D	Cartridge, 0.50 caliber, Tracer, M17 (M2) BODIC: A571	, M17 (M2)			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} /	× 12	Maximum Concentration (µg/m³)	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 12
2.Hexanone	ĄN	5.11E+00		na		ΨZ	4.09E+04		na
Dihromochloromethane	Ž	8.00E-02		na		NA	6.00E+03		па
1 2-Dibromoethane	¥	8.73E-03		na		NA	1.54E+05		na
Chlorobenzene	¥	6.21E+01		na		AN	1.38E+05		na
1 1 1 2-Tetrachloroethane	¥	2.60E-01		na		NA	5.15E+04		na
Ethylbenzene	2.60E-03	1.06E+03	2.46E-06	2	8.45E-01	8.45E-01	5.43E+05	1.56E-06	2
m&p-Xylene	4.93E-03	7.30E+02	6.76E-06	2	1.60E+00	1.60E+00	6.51E+05	2.46E-06	2
o-Xvlene	4.02E-03	7.30E+02	5.50E-06	2	1.30E+00	1.30E+00	6.51E+05	2.00E-06	2
Stvrene	9.83E-03	1.06E+03	9.29E-06	2	7.98E-01	7.98E-01	2.13E+05	3.74E-06	2
Bromoform	ΑN	1.75E+00		na		NA	6.20E+03		na
Cumene	A'N	4.02E+02		na		NA	2.46E+05		na
1.1.2.2-Tetrachloroethane	ΑN	3.31E-02		na		NA	2.06E+04		na
1.2.3-Trichloropropane	AN	9.61E-04		na		Ϋ́	6.03E+04		na
Bromobenzene	ΑΝ	1.04E+01		na		ΑN	4.82E+04		na
4-Ethyltoluene	AN	N		na		NA	1.25E+05		na
1,3,5-Trimethylbenzene	ΑN	6.21E+00		na		Ϋ́	3.68E+05		<u>na</u>
Alpha Methyl Styrene	ΑN	2.56E+02		na		ΔN	ΑΝ		БĒ
1,2,4-Trimethylbenzene	9.01E-04	6.21E+00	1.45E-04	2	2.92E-01	2.92E-01	1.80E+05	1.62E-06	2
1,3-Dichlorobenzene	AN	3.29E+00		na		₹ Z	3.61E+04		na
1,4-Dichlorobenzene	NA	3.06E-01		na		AA	6.61E+05		na
Benzyl Chloride	NA	3.96E-02		na		¥N.	5.20E+03		na I
1,2-Dichlorobenzene	NA	2.09E+02		na		¥ V	3.01E+05		g
Hexachlorethane	ΝA	4.80E-01		na		¥N.	2.90E+04		g
1,2,4-Trichlorobenzene	NA	2.08E+02		na		Ą	3.71E+04		g
Hexachlorobutadiene	AN	8.73E-02		na		AN N	3.21E+04		E E
Hydrocarbons					LEG	0.075	30000	2 945 04	2
Methane	2.89E+00	N		na	9.37=+02	9.375+02	3.305+00	4 24 1 04	2 2
Ethylene	1.85E-01	N		na	6.02E+01	6.02E+01	4.60E+U3	1.316-04	2 2
Acetylene	2.53E-02	N		na	2.06E+00	2.06E+00	AN .		<u> </u>
Ethane	1.05E-01	N		па	8.50E+00	8.50=+00	ΨZ:		20
Propylene	5.02E-02	N		na	4.07E+00	4.07E+00	AN C		na
Propane	NA	N		na		Ą	3.78E+06		Па
Propyne (methyl acetylene)	NA	N/		na		₹.	2.79E+06		ag (
Isobutane	AN	N<		na		Y Z	9.52E+05		B
1-Butene/Isobutylene (115-11-7)	NA	N/		na		AN A	6.87=+00		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 100 meter location

			Cantridge,	0.50 DC	Cartridge, 0.50 callber, Tracer, M/7 (M2) DODIC: A571	M17 (M2)			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (μg/m³)	C _{chronic} / HBSL	> 12	Maximum Concentration (µg/m³)	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} /	× 1-2
	\sqrt{Z}	3 74F-03		na		AN	2.20E+04		БĒ
1,3-Butadiene/butane	Y AZ	N N		na		ΝΑ	1.72E+04		na
Cis-Duterie	ΔV	N.		na		AN	NA NA		g
1-Butyne	Z AN	2		na		NA	1.72E+04		na
trans-butelle	ΔN	N		na		NA	NA		Бā
Z-Butyne (crotoliylerie)	S Z	N		na		ΑΝ	1.80E+06		ē
n-Ferrana n-Hexana	1.84E-01	2.10E+02	8.75E-04	ou	5.96E+01	5.96E+01	5.28E+05	1.13E-04	2
SVOCS							00.000		3
n-nitrosodimethylamine	ΑΝ	1.37E-04		na		A A	2.50E+03		2 2
his/2 chloroethyllother	AN	5.82E-03		na		NA	5.85E+04		g
US(x-cilloratiyi)cusa	Y A	2.19E+03		na		NA	3.85E+04		na
longland o	ΔN	1 83E+01		na		NA	5.25E+03		<u>a</u>
4.3 Dishloshoszene	AN	3.29E+00		na		NA	3.61E+04		Б
1,3-Dichiolobenzene	V V	3.06F-01		па		AN	6.61E+05		ББ
1,4-dichiorobenzene		2 09E+02		ББ		ΥZ	3.01E+05		па
1,2-dichlorobenzene	2 2	1 10E+03		E		ΑN	5.53E+04		na
benzyl alcohol	2 2	1.10E-03		2		ΨX	6.99E+04		na
bis(2-chloroisopropyl)etner	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1.32E-01		2		₹	NA		na
2-methylphenol	¥.	1,005,102		2 2		Ą	2.90E+04		na
hexachloroethane	₹ Z	4.00=-01		2 2		¥	2.00E+02		na
n-nitroso-di-n-propylamine	¥ .	9.01E-04		2 6		¥	AN		na
4-methylphenol	¥ S	1.035402		2 2		Ϋ́	1.51E+04		na
nitrobenzene	<u> </u>	7.08E+00		na		ΑN	2.83E+04		na
sophorone		NN NN		na		ΑN	NA		na
Z-nitropnenoi	₹	7 30E+01		na		ΝA	AN		na
Z,4-dimeniyipilerioi	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	2		na		AN	NA NA		Б
bis(2-chloroethoxy)methane	V	1 10F+01		na		NA	3.00E+04		na
Z,4-dichlorophenol	2 2	2 DRE+02		na		AN	3.71E+04		na
1,2,4-trichlorobenzene	1 REE 00	3 13E+00	5 30F-03	2	5.38E+00	5.38E+00	7.86E+04	6.84E-05	2
naphthalene	ANA ANA	1 46F+01		па		AN	3.00E+04		na
4-cnloroarmine	5 2	8 62E-02		na		ΑN	3.21E+04		na
hexachiorobutadiene	\$ 2	NA VIA		2		ΑN	2.00E+04		na
4-chloro-3-methylphenol	¥ S	1 20E+04		2 0		Ž	2.00E+04		na
2-methylnaphthalene	¥:	1.305.7		2 0		ĄZ	2.23E+02		na
hexachlorocyclopentadiene	¥ :	4.405-02		2 2		₹Z	3.00E+04		na
2,4,6-trichlorophenol	ΨZ.	1.105+02		9 0		₹N N	3.00E+04		na
2,4,5-trichlorophenol	NA NA	3.055702		3					

			Cartridge	0.50 (D)	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	, M17 (M2)			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (μg/m³)	C _{chronic} / HBSL	> 12	Maximum Concentration (µg/m³)	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
	< 14	2 02 E+∩2		2		ĄZ	6.00E+02		na
2-chloronaphthalene	₹ 4 Z	2.32E: 02		2		AN	NA		na
ariiin Gariiin - Z	Z Z	N/N		БП		Ą	2.00E+02		na
Acenaphinylerie	Q A	3.65E+04		2		AN	1.50E+04		ББ
	AN	3.65E+00		na		ΝA	6.00E+02		na
Z,o-ullillocoldene	ĄN V	2.19E+02		ē		NA	1.25E+03		па
3-pitropuline	AN AN	2		na		NA	NA		na
oranicoanii V C	AN	7.30E+00		na		NA	7.50E+03		na
2,4-ditiliopiration	AN AN	1.46E+01		na		AN	AA		па
Oliber Zoldran	AN	7.30E+00		na		NA	6.00E+02		na
2,4-ultroband	Y N	2.92E+01		na		ΝΑ	3.00E+04		na
Chorido	ΔN	1.46E+02		na		NA	7.50E+04		Ва
riudielle	AN	2		na		NA	NA		na
4-chlorophenyi-phenyi-	Z Z	2 92F+03		na		ΑN	1.50E+04		па
dietnylprinalate		NV NV		ng.		NA	9.00E+03		na
4-niiroaniiine		3 65E-01		na		ΑN	5.00E+02		na
4,6-dinitro-2-metnyipnenoi	2 2	4 37E+00		2		ΑN	NA		na
n-nitrosodiphenylamine(1)	\$ 2	NV NV		2		Ϋ́	ΑN		na
4-bromophenyl-phenyletner	X × 2	4 18E-03		2 2		₹Z	7.50E+01		na
hexachlorobenzene	2 2	4.10E-03		29		ďΖ	1.50E+03		na
pentachlorophenol	2 2	NN NN		na B		₹N	2.00E+03		na
pnenantinrene	Q A	1 10E+03		2		Ϋ́	6.00E+03		na
di n'hihibhhalata	AN AN	3.65E+02		na		NA	1.50E+04		na
flioranthene	AN AN	1.46E+02		na		NA	3.00E+01		па
DVFENE	ΑN	1.10E+02		na		¥.	1.50E+04		la I
butylbenzylphthalate	AN	7.30E+02		na		¥.	5.00=+05		2 2
benzo(a)anthracene	ΨN	2.17E-02		na		ΨZ.	9.00E+02		2
chrysene	ΨX	2.17E+00		na		¥ Z	2.00E+02		2 2
3,3-dichlorobenzidine	Ϋ́	1.50E-02		na		AN C	1	2 24 0	-
bis(2-ethylhexyl)phthalate	2.92E-01	4.80E-01	6.08E-01	2	2.21E+02	2.21E+02	_	7.715-02	4
di-n-octylphthalate	Ϋ́	7.30E+01		na		₹.	1.5U+TU5		2 2
benzo(b)fluoranthene	AN	2.17E-02		na		AN.	42		2
benzo(k)fluoranthene	ΑN	2.17E-01		na		Y Y	AN P		<u> </u>
benzo(a)pyrene	ΑN	2.17E-03		na		₹.	7.50E+03		2 2
indeno(1.2.3-cd)pyrene	Ą	2.17E-02		na		¥	NA POSTO		<u> </u>
dibenz(a.h)anthracene	AN	2.17E-03		na		¥ N	3.00E+04		B
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Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 100 meter location

			Cartridge,	0,50 D	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	, M17 (M2)			
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	v 12	Maximum Concentration (µg/m³)	C _{acute} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 12
benzo(g,h,i)perylene	NA	N		na		NA	3.00E+04		па
TO-13 (PAHs)			1,00	1	20.7	2000	7 00 1	4 20E A	3
naphthalene	1.04E-02	3.13E+00	3.31E-03	2	3.36E+00	3.36E+00	7.80E+04	4.Z0E-U3	2
acenaphthylene	7.28E-04	N		na	2.36E-01	2.36E-01	2.00E+02	1.18E-03	2
Acenaphthene	8.54E-05	2.19E+02	3.90E-07	2	2.77E-02	2.77E-02	1.25E+03	2.22E-U5	2
fluorene	3.03E-04	1.46E+02	2.08E-06	2	9.84E-02	9.84E-02	7.50E+04	1.31E-06	2
phenanthrene	2.45E-04	ΛN		Бā	7.94E-02	7.94E-02	2.00E+03	3.97E-05	2
anthracene	4.10E-05	1.10E+03	3.74E-08	2	1.33E-02	1.33E-02	6.00E+03	2.22E-06	2
fluoranthene	3.09E-04	1.46E+02	2.12E-06	2	1.00E-01	1.00E-01	3.00E+01	3.34E-03	2
pyrene	4.43E-04	1.10E+02	4.05E-06	2	1.44E-01	1.44E-01	1.50E+04	9.58E-06	2
benzo(a)anthracene	9.73E-05	2.17E-02	4.49E-03	ou	7.37E-02	7.37E-02	6.00E+02	1.23E-04	2
chrysene	1.00E-04	2.17E+00	4.62E-05	o	7.59E-02	7.59E-02	2.00E+02	3.79E-04	2
benzo(b)fluoranthene	1.58E-04	2.17E-02	7.27E-03	no	2.98E-02	2.98E-02	NA		па
benzo(k)fluoranthene	9.20E-05	2.17E-01	4.24E-04	no	1.74E-02	1.74E-02	NA		па
Benzo(e)byrene	4.43E-04	N		na	3.60E-02	3.60E-02	NA		g
benzo(a)bvrene	1.36E-04	2.17E-03	6.28E-02	ou	1.03E-01	1.03E-01	7.50E+03	1.38E-05	2
indeno(1.2.3-cd)pyrene	1.47E-04	2.17E-02	6.78E-03	ou	2.78E-02	2.78E-02	۷		na
dibenz(a.h)anthracene	1.65E-05	2.17E-03	7.60E-03	ou	1.25E-02	1.25E-02	3.00E+04	4.16E-07	2
benzo(g,h,i)perylene	6.53E-04	N		na	2.12E-01	2.12E-01	3.00E+04	7.06E-06	2
Dioxins and Furans									
2378-Tetrachlorodibenzo-p-dioxin	ΑN	4.48E-08		na		Y Y	3.50E+00		Б
12378-Pentachlorodibenzo-p-dioxin	ΑZ	N		na		¥	2.50E+00		g
123478-Hexachlorodibenzo-p-dioxin	AN	N		na		¥	AN		g
123678-Hexachlorodibenzo-p-dioxin	NA	N		na		₹	1.50E+01		g S
123789-Hexachlorodibenzo-p-dioxin	NA	1.48E-06		na		∀ N	ΔZ.		g
1234678-Heptachlorodibenzo-p-dioxin	8.56E-09	N<		na	6.94E-07	6.94E-07	AN 1	107.0	g i
OCDD	1.44E-07	N		па	4.68E-05	4.68E-05	1.50E+02	3.12E-07	2
2378-Tetrachlorodibenzo-p-furan	NA	N		па		¥	2.00E+00		<u>na</u>
12378-Pentachlorodibenzo-p-furan	ΑN	NV		na		₹	¥N.		Б
23478-Pentachlorodibenzo-o-furan	ΑN	N		па		ĄN	7.50E-02		na
123478-Hexachlorodibenzo-p-furan	Ϋ́	NN		na		ΑΝ	7.50E+00		g
123678-Hexachlorodibenzo-p-furan	₹	N		na		ΑN	2.50E+00		g
123789-Hexachlorodibenzo-p-furan	NA	N		па		ĕ	AN L		na
234678-Hexachlorodibenzo-p-furan	NA	N		na		ΨN.	1.50=+00		na I
1234678-Heptachlorodibenzo-p-furan	2.57E-09	N<		na	2.09E-07	2.09E-07	AN NA		na

Table D-1: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 100 meter location

			Cartridge,	0.50 D(Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	. M17 (M2)			
Compound	С _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} / HBSL	> 1?	Maximum Concentration (µg/m³)	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
1234789-Heptachlorodibenzo-p-furan	ΨZ	≥ N		na		NA	AN		na
OCDF	8.82E-09	NV		na	2.86E-06	2.86E-06	3.00E+02	9.54E-09	5
Energetics									
Nitrobenzene	AN	2.09E+00		na		ΑA	1.51E+04		па
2-Nitrotoluene	Ϋ́	3.65E+01		na		NA	ΝΑ		na
3-Nitrotoluene	ΨN	3.65E+01		na		NA	ΝΑ		na
4-Nitrotoluene	ΑN	3.65E+01		na		NA	3.37E+04		na
Nitroglycerine	AA	4.80E-01		na		NA	Ν Α		na
1,3-Dinitrobenzene	NA	3.65E-01		na		NA	3.00E+03		na
2,6-Dinitrotoluene	ΑN	3.65E+00		na		NA	6.00E+02		na
2,4-Dinitrotoluene	AN	7.30E+00		na		NA	6.00E+02		na
1,3,5-Trinitrobenzene	ΑN	1.10E+02		na		ΝΑ	3.00E+04		na
2,4,6-Trinitrotoluene	ΑN	2.24E-01		na		ΝA	2.50E+04		na
RDX	AN	6.11E-02		na		ΝΑ	NA		na
4-Amino-2,6-Dinitrotoluene	NA	NN		na		ΝΑ	ΑN		na
2-Amino-2,6-Dinitrotoluene	NA	ΛN		na		NA	1.50E+04		na
Tetryl	AA	3.65E+01		na		Ϋ́	ΑN		na
HMX	ΑΝ	1.83E+02		na		NA	NA		na
Pentaerythritoltetranitrate	ΑN	NN		na		ΑN	5.00E+01		па
Dibutyl Phthalate	Ν	3.65E+02		na		Ϋ́	1.50E+04		na
Dioctyl Phthalate	ΑN	4.80E-01		na		ΑΝ	1.00E+04		na
Diphenylamine	NA	9.13E+01		na		NA NA	3.00E+04		na

Footnotes:

NA: Not applicable because compound was not detected

na: Not available because health-based sceening value is not available or not applicable if compound was not detected

NV: No value available

Canonic: Chronic time-averaged concentration

HBSL: Chronic health-based screening level

Cacute: Acute concentration

ATV: Acute toxicity value

Table D-2: Comparison of Modeled Air Concentrations with Health-Based Values (M17): Total Petroleum Hydrocarbons - 100 meter location

	Ça	ு©aimildge; 0¥50कallbr Doblic	aliber, Tracer, MA7 (M2))©(C. A5/1	
Compound (a)	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	С _{сhronic} (µg/m³)	С _{chronic} (µg/m³)
	Allphatic:C<=8	Alliphatic:C>8	Aromatic: C<=8	Aromatic:C>8
Permanent Gases				
Pentane	8.19E-04	NA	NA A	NA
Benzene	NA	NA	2.87E-01	Z Z
Toluene	NA	NA	3.25E-02	NA NA
Ethvlbenzene	NA	NA	2.60E-03	NA
m&p-Xvlene	AN	NA	4.93E-03	NA NA
o-Xylene	NA	NA	4.02E-03	NA NA
Styrene	NA	NA	NA	9.035-03
1,2,4-Trimethylbenzene	NA	NA	NA	9.016-04
Propylene	5.02E-02	NA	NA	3
n-Hexane	1.84E-01	NA A		1 660 00
naphthalene	NA	NA		1 045-02
naphthalene	NA	NA	NA	7.040-02
acenaphthylene	NA	NA	NA	7.200-04
Acenaphthene	NA	NA.	NA	8.54E-US
fluorene	NA	NA A	NA	3.03E-04
phenanthrene	NA	NA	NA	2.40E-04
anthracene	NA	NA	NA	4. 105-05
fluoranthene	NA	NA	NA A	3.09⊏-04
Total (µg/m³)	2.35E-01	0.00E+00	3.31E-01	3.94E-02
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	1.22E-05	0.00E+00	7.93E-04	1.89E-04
>1?	no	no	no	no
Footnotes: >1? = Is the ratio greater than one? NA = Not Applicable because compound was not detected				
C _{chronic} = chronic averaged air Concentration HBSL = Health-Based Screening Level				

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

		Cantri	1ge, 0.50 c □0	alibe DIC	Cantridge, 0'50 caliber, Tracer, Mt7 (M2)	7 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	4 72
Permanent Gases								
Ammonia (NH3)	7.03E+00	1.04E+02	6.74E-02	2	5.70E+02	1.75E+04	3.26E-02	9
Carbon Dioxide (CO2)	1.82E+02	NV		na	5.92E+04	5.40E+07	1.10E-03	2
Carbon Monoxide (CO)	3.50E+02	1.00E+04	3.50E-02	ou	2.84E+04	2.30E+05	1.24E-01	2
Oxides of Nitrogen (as NO)	1.54E+01	1.00E+02	1.54E-01	2	5.00E+03	3.08E+04	1.62E-01	2
Sulfur Dioxide (SO2)	9.07E-02	8.00E+01	1.13E-03	0	7.36E+00	7.89E+02	9.32E-03	2
Acid Gases								
Hydrogen fluoride	NA	NV		na	ΑN	1.60E+03		па
Hydrogen chloride	AN	2.08E+01		na	NA	4.50E+03		na
Hydrogen bromide	NA	N		na	NA	9.93E+03		na
Nitric Acid	NA	NV		na	NA NA	1.30E+03		na
Phosphoric acid	ΑN	1.04E+01		na	NA	3.00E+03		na
Sulfuric Acid	1.49E-01	N		na	1.21E+01	2.00E+03	6.05E-03	2
Cyanide								
Particulate Cyanide	2.26E-01	7.30E+01	3.10E-03	ou	7.34E+01	5.00E+03	1.47E-02	2
Hydrogen Cyanide	2.81E+00	3.13E+00	8.98E-01	o	9.12E+02	5.17E+03	1.76E-01	2
Particulates								
Total Suspended Particulate	1.32E+01	5.00E+01	2.64E-01	01 0	1.07E+03	NA		na
PM10	1.21E+01	5.00E+01	2.42E-01	no	9.82E+02	NA		na
PM2.5	7.06E+00	1.50E+01	4.70E-01	2	5.72E+02	NA		na
Metals								
Aluminum	2.79E-02	5.11E+00	5.46E-03	2	9.06E+00	3.00E+04	3.02E-04	2
Antimony	2.20E-01	1.46E+00	1.51E-01	2	7.14E+01	1.50E+03	4.76E-02	2
Arsenic	NA	4.47E-04		na	Y.	3.00E+01	20 277	na
Barium	3.44E-01	5.21E-01	6.59E-01	2	1.12E+02	1.50E+03	7.44E-02	2
Beryllium	NA	8.00E-04		na	¥	5.00E+00		g
Cadmium	NA	1.07E-03		na	NA A	3.00E+01		na
Calcium	1.12E-01	NV		na	3.63E+01	3.00E+04	1.21E-03	2
Chromium	AN	1.53E-04		na	ΑΝ	1.50E+03		na
Cobalt	ΑN	2.20E+02		na	NA	6.00E+01		na
Copper	4.27E+00	1.46E+02	2.93E-02	no	1.39E+03	3.00E+03	4.62E-01	2
Lead	4.45E-01	1.50E+00	2.97E-01	OD.	1.45E+02	1.50E+02	9.63E-01	2
Magnesium	8.83E-02	N		na	2.86E+01	3.00E+04	9.55E-04	2
Manganese	NA	5.11E-02		na	A V	3.00E+03		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

Emily 2 Section		Gartric	lge, 0.50 c DO	0 caliber, Trad DODIC: A571	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	7 (M2)		
Compound	С _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronle} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	× 1?
Nickel	Ϋ́	7.30E+01		na	NA	3.00E+03		na
Selenium	¥	1.83E+01		na	ΝA	6.00E+02		na
Silver	ΑN	1.83E+01		na	NA	3.00E+02		na
Thallium	AN	2.56E-01		na	NA	3.00E+02		па
Vanadium	NA	2.56E+01		na	AA	1.50E+02	1	na
Zinc	7.04E-01	1.10E+03	6.43E-04	2	2.28E+02	3.00E+04	7.61E-03	2
TO-11 Carbonyls							10000]
Formaldehyde	4.09E-03	1.48E-01	2.77E-02	2	7.74E-01	1.23E+03	6.29E-04	2
Acetaldehyde	AN	8.73E-01		na	ΑN	1.80E+04		g
Acetone	NA	3.65E+02		па	ΑN	2.37E+06		Вa
Acrolein	AN	2.09E-02		na	Ϋ́	2.30E+02		g
Proprionaldehyde	NA	N		na	NA	7.50E+04		na
Crotonaldehyde	AN	3.54E-03		na	Ϋ́	5.72E+03		na
Butvraldehyde	ΑN	N N		na	Ϋ́	7.38E+04		na
Benzaldehyde	AN	3.65E+02		na	Ϋ́	1.50E+04		na
Isovaleraldehyde	AN	N/		na	Ϋ́	NA		g
Valeraldehyde	AN	N		na	Ϋ́	AN		В
o m.p-Tolualdehyde	AN	N		na	ΑΝ	AN AN		В
Hexaldehyde	NA	N		na	AN	NA		g
2,5-Dimethylbenzaldehyde	AN	NV		na	ΑN	AN A		na
VOCs								Ţ
Propene	2.29E-02	N		na	1.86E+00	AN I		g
Dichlorodifluoromethane	ΑN	2.09E+02		na	¥ :	1.48E+U/		
Chlorodifluoromethane	AN	5.11E+04		na	₹ :	4.4101		2 2
Freon 114	NA	2		na	AN .	Z.10E+07	0.005.07	<u> </u>
Chloromethane	6.05E-05	1.07E+00	5.67E-05	2	4.58E-02	Z.06E+05	7.22E-07	2 3
Vinyl Chloride	AN	2.20E-02		g	AN	1.28E+04	100	<u> </u>
1.3-Butadiene	2.21E-03	3.74E-03	5.91E-01	2	4.18E-01	2.20E+04	1.90E-05	2
Bromomethane	NA	5.21E+00		na	Ą	5.82E+04		g
Chloroethane	ΝA	2.32E+00		na	ΑΝ	2.64E+06		g
Dichlorofluoromethane	AN	2.09E+02		па	A A	1.48E+07		ē
Trichlorofluoromethane	7.11E-05	7.30E+02	9.74E-08	2	2.31E-02	2.81E+06	8.22E-09	2
Pentane	3.44E-04	NN		Б	1.12E-01	1.80E+06	6.20E-08	2
Acrolein	NA	2.09E-02		g	AN NA	Z.30E+0Z		Z Z

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

		Cantric	ige, 0.50 c D⊙	0 caliber, Tra DODIC: A571	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	7 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	× 1->
1.1-Dichloroethene	AN	5.21E+02		na	AN	7.92E+04		na
Freon 113	NA	3.13E+04		na	NA	9.58E+06		Б
Acetone	3.51E-02	3.65E+02	9.63E-05	ou	1.14E+01	2.37E+06	4.81E-06	2
Methyl lodide	AN	N/		na	NA	1.45E+05		g
Carbon Disulfide	NA A	7.30E+02		na	NA	3.11E+04		na
Acetonitrile	3.51E-02	6.20E+01	5.66E-04	no	1.14E+01	1.01E+05	1.13E-04	2
3-Chloropropene	AN	1.04E+00		na	NA	9.39E+03		na
Methylene Chloride	1.65E-02	4.09E+00	4.03E-03	no	3.12E+00	6.96E+05	4.48E-06	2
tert-Butyl Alcohol	ΑN	N		na	NA	4.55E+05		na
Acrylonitrile	3.24E-03	2.83E-02	1.15E-01	no	6.13E-01	2.17E+04	2.83E-05	2
trans-1.2-Dichloroethene	ΑN	7.30E+01		na	NA	4.95E+04		g
Methyl t-Butyl Ether	ĄN	3.13E+03		na	NA	4.32E+05		na
Hexane	ΑΝ	2.09E+02		na	NA	5.28E+05		па
1.1-Dichloroethane	AN	5.21E+02		na	NA	1.21E+06		Б
Vinyl Acetate	AN	2.09E+02		na	NA	1.92E+04		Ba
cis-1.2-Dichloroethene	ΑN	3.65E+01		na	NA	7.92E+05		na
2-Butanone	AN	1.04E+03		na	AN	8.85E+05		na
Ethyl Acetate	4.16E-03	3.29E+03	1.27E-06	ou	1.35E+00	1.44E+06	9.37E-07	2
Methyl Acrylate	AA	1.10E+02		na	AN	NA		na
Chloroform	NA AA	8.35E-02		na	ΑN	9.76E+03		na
1 1 1-Trichloroethane	1.57E-04	1.04E+03	1.51E-07	9	1.27E-02	1.94E+06	6.56E-09	2
Carbon Tetrachloride	NA	1.28E-01		na	AN	1.28E+05		па
1,2-Dichloroethane	1.01E-03	7.39E-02	1.36E-02	on O	7.63E-01	8.08E+03	9.44E-05	2
Benzene	5.16E-02	2.49E-01	2.07E-01	ဥ	9.77E+00	1.56E+05	6.26E-05	2
Isooctane (2,2,4-trimethylpentane)	ΨN	N		na	NA	3.50E+05		na
Heptane	ΨZ	N		na	AA	1.80E+06		па
Trichloroethane	AN	1.04E+03		na	NA	1.94E+06		na
Ethyl Acrylate	ΑΝ	1.40E-01		na	NA	6.14E+04		па
1.2-Dichloropropane	ΑN	9.89E-02		па	NA	5.08E+05		БП
Methyl Methacrylate	ΑN	7.30E+02		па	A'A	4.09E+05		na
Dibromomethane	ΑN	3.65E+01		na	NA	2.50E+05		na
1,4-Dioxane	NA	6.11E-01		na	ΑΝ	9.00E+04		na L
Bromodichloromethane	AN	1.08E-01		na	AN	4.00E+03		<u>a</u>
4-Methyl-2-Pentanone	AN	8.34E+01		g	AN	3.07E+05	_	na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

		Gantric	lge, 0.50 ca DOI	50 caliber, Trad DØDIC: A571	Cartridge, 0.50 caliber, Tracer, M17 (M2) D@DIC: A571	7 (M2)		
Compound	С _{сhronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	× 12
Toluene	1.36E-02	4.02E+02	3.40E-05	no	1.11E+00	1.88E+05	5.90E-06	92
Octane	AN	N		na	NA	NA		па
trans-1.3-Dichloropropene	AN	5.17E-02		na	NA	NA		na
Ethyl Methacrylate	ΑΝ	3.29E+02		na	NA	Y V		na
1.1.2-Trichloroethane	ΑN	1.20E-01		na	ΝΑ	1.64E+05		na
Tetrachloroethene	ΑN	3.31E+00		g	ΑΝ	6.78E+05		na E
2-Hexanone	ΝΑ	5.11E+00		g	ΑΝ	4.09E+04		па
Dibromochloromethane	AN	8.00E-02		na	NA	6.00E+03		na
1 2-Dibromoethane	ΝΑ	8.73E-03		na	NA	1.54E+05		g
Chlorobenzene	NA V	6.21E+01		na	NA	1.38E+05		Бa
1 1 1 2-Tetrachloroethane	NA	2.60E-01		na	NA	5.15E+04		па
Ethylbenzene	1.09E-03	1.06E+03	1.03E-06	ou	3.55E-01	5.43E+05	6.54E-07	2
m&p-Xvlene	2.07E-03	7.30E+02	2.84E-06	no	6.72E-01	6.51E+05	1.03E-06	2
o-Xvlene	1.69E-03	7.30E+02	2.31E-06	no	5.47E-01	6.51E+05	8.41E-07	2
Styrene	4.13E-03	1.06E+03	3.90E-06	20	3.35E-01	2.13E+05	1.57E-06	2
Bromoform	AN	1.75E+00		na	NA	6.20E+03		па
Cumene	ĄN	4.02E+02		na	NA	2.46E+05		na
1.1.2.2-Tetrachloroethane	AN	3.31E-02		na	ΑN	2.06E+04		na
1.2.3-Trichloropropane	AN	9.61E-04		na	NA	6.03E+04		na
Bromobenzene	NA	1.04E+01		Б	Y Y	4.82E+04		g
4-Ethyltoluene	NA	N		па	NA NA	1.25E+05		Ja
1,3,5-Trimethylbenzene	NA	6.21E+00		na	₹	3.68E+05		ag ?
Alpha Methyl Styrene	NA	2.56E+02		na	AN I	AN 100	0 000	a s
1,2,4-Trimethylbenzene	3.78E-04	6.21E+00	6.10E-05	2	1.23E-01	1.80E+05	0.82E-U/	2
1,3-Dichlorobenzene	NA	3.29E+00		na	Y.	3.61E+04		2
1,4-Dichlorobenzene	NA	3.06E-01		na	YA YA	6.61E+U5		g S
Benzyl Chloride	NA	3.96E-02		na	YZ Z	5.20=+03		E S
1,2-Dichlorobenzene	NA	2.09E+02		na	ΝΑ	3.01E+05		па
Hexachlorethane	NA	4.80E-01		na	AN N	2.90E+04		na
1,2,4-Trichlorobenzene	ΝΑ	2.08E+02		na	ΑΝ	3.71E+04		na
Hexachlorobutadiene	NA	8.73E-02		na	AN	3.21E+04		na
Hydrocarbons					20.7	30. Inc. c	4 405 04	5
Methane	1.21E+00	AN I		ā	3.93E+02	3.305.400	1.101-01	2

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

		Cartric	dge, 0.50 c DO	aliber DIC:	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	7 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (μg/m³)	C _{acute} / ATV	> 1?
Ethylene	7.79E-02	N N		na	2.53E+01	4.60E+05	5.49E-05	on O
Acetylene	1.06E-02	N .		na	8.63E-01	NA		na
Ethane	4.40E-02	N .		na	3.57E+00	NA		na
Propylene	2.11E-02	N		na	1.71E+00	NA		na
Propane	NA	NV		na	ΑN	3.78E+06		na
Propyne (methyl acetylene)	NA	NV		na	AN	2.79E+06		na
Isobutane	ΝΑ	ΛN		na	NA	9.52E+05		na
1-Butene/Isobutylene (115-11-7)	NA	NN		na	NA	6.87E+06		na
1,3-Butadiene/butane	ΑN	3.74E-03		na	NA	2.20E+04		na
cis-butene	ΑN	ΛN		na	NA	1.72E+04		na
1-Butyne	ΑΝ	N		na	NA	NA		na
trans-Butene	NA	ΛN		na	NA	1.72E+04		na
2-Butyne (crotonylene)	NA	ΛN		na	NA	NA		na
n-Pentane	ΑN	ΛN		na	NA	1.80E+06		na
n-Hexane	7.72E-02	2.10E+02	3.68E-04	2	2.50E+01	5.28E+05	4.74E-05	2
SVOCs								
n-nitrosodimethylamine	NA	1.37E-04		na	ΑN	2.50E+03		na
bis(2-chloroethyl)ether	NA	5.82E-03		na	NA	5.85E+04		na
phenol	NA	2.19E+03		na	NA	3.85E+04		па
2-chlorophenol	NA	1.83E+01		na	NA	5.25E+03		na
1,3-Dichlorobenzene	NA	3.29E+00		na	AA	3.61E+04		na
1,4-dichlorobenzene	NA	3.06E-01		na	AN	6.61E+05		na
1,2-dichlorobenzene	NA	2.09E+02		na	AN N	3.01E+05		Б
benzyl alcohol	NA	1.10E+03		na	ΝΑ	5.53E+04		па
bis(2-chloroisopropyl)ether	NA	1.92E-01		na	NA	6.99E+04		na
2-methylphenol	NA	1.83E+02		na	NA	AN		па
hexachloroethane	NA	4.80E-01		na	ΑN	2.90E+04		na
n-nitroso-di-n-propylamine	NA	9.61E-04		na	Ϋ́	2.00E+02		na
4-methylphenol	NA	1.83E+02		na	NA NA	AN		na
nitrobenzene	NA	2.09E+00		na	AN A	1.51E+04		Бā
isophorone	NA	7.08E+00		па	AN A	2.83E+04		na
2-nitrophenol	NA	N		멸	AN	Ϋ́		g
2,4-dimethylphenol	NA	7.30E+01		па	AN .	AN.		g
bis(2-chloroethoxy)methane	AN	N N		na	¥Z	NA NA		na

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

		Cartinio	lge, 0.50 c DO	alibe DIC:	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	7 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	C _{acute} (µg/m³)	Acute Toxicity Value (μg/m³)	Cacute/ ATV	> 1?
2.4-dichlorophenol	ΝΑ	1.10E+01		na	NA	3.00E+04		па
1.2.4-trichlorobenzene	Ą	2.08E+02		na	NA	3.71E+04		па
naphthalene	6.96E-03	3.13E+00	2.23E-03	no	2.26E+00	7.86E+04	2.87E-05	2
4-chloroaniline	ΝΑ	1.46E+01		na	NA	3.00E+04		na
hexachlorobutadiene	NA	8.62E-02		na	NA	3.21E+04		ББ
4-chloro-3-methylphenol	NA	NV		na	ΔA	2.00E+04		g
2-methylnaphthalene	AN	7.30E+01		na	NA	2.00E+04		па
hexachlorocyclopentadiene	NA	7.30E-02		na	NA	2.23E+02		na
2,4,6-trichlorophenol	AN	1.10E+02		na	ΑΝ	3.00E+04		na
2,4,5-trichlorophenol	NA	3.65E+02		na	NA	3.00E+04		na
2-chloronaphthalene	AN	2.92E+02		Б	ΑΝ	6.00E+02		na
2-nitroaniline	AN	2.09E-01		na	۸A	NA		na
Acenaphthylene	ΑN	N/		na	NA	2.00E+02		na
dimethylphthalate	ΑN	3.65E+04		na	Ą	1.50E+04		Ba
2,6-dinitrotoluene	AN	3.65E+00		па	ΨN	6.00E+02		Б
acenaphthene	AN	2.19E+02		na	A A	1.25E+03		na
3-nitroaniline	Ϋ́	NN		na	AA	ΑN		па
2,4-dinitrophenol	NA	7.30E+00		na	ΑΝ	7.50E+03		na
dibenzofuran	ΑN	1.46E+01		na	¥	NA		na
2,4-dinitrotoluene	AN	7.30E+00		na	NA	6.00E+02		па
4-nitrophenol	Ν	2.92E+01		g	AN	3.00E+04		g
Fluorene	NA	1.46E+02		na	¥	7.50E+04		Б
4-chlorophenyl-phenylether	NA	N		g	¥N.	¥N.		E
diethylphthalate	NA	2.92E+03		na	AN N	1.50E+04		ng L
4-nitroaniline	NA	N		na	ΑN	9.00E+03		g
4,6-dinitro-2-methylphenol	NA	3.65E-01		na	Y Y	5.00E+02		па
n-nitrosodiphenylamine(1)	NA	1.37E+00		na	Y V V	ΑΝ		na
4-bromophenyl-phenylether	NA	NN		Б	ΑA	AA A		na
hexachlorobenzene	ΝΑ	4.18E-03		na	NA V	7.50E+01		na
pentachlorophenol	NA	5.60E-02		na	NA	1.50E+03		па
phenanthrene	NA	NV		na	NA	2.00E+03		Б
anthracene	NA	1.10E+03		Б	AN	6.00E+03		па
di-n-butylphthalate	AN	3.65E+02		g	₹ Z	1.50E+04		na
fluoranthene	AN	1.46E+02		B	NA NA	3.00E+01		Ja

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

		Cantrio	lge, 0.50 ca DOI	0 caliber, Tra DODIC: A571	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	7 (M2)		λ.
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	Cacute/ ATV	> 13
Cocario	ΑN	1.10E+02		Ē	ΑN	1.50E+04		na
pyrene hitrihenzylohthalate	ΑN	7.30E+02		na	NA	5.00E+05		Па
henzo(a)anthracene	Ϋ́Z	2.17E-02		na	NA	6.00E+02		па
cho/cana	AN AN	2.17E+00		na	NA	2.00E+02		g
3 3-dichlorobenzidine	Ą	1.50E-02	-	na	NA	6.21E+03		Ва
his/2-ethylhexyl)phthalate	1.23E-01	4.80E-01	2.55E-01	no	9.29E+01	1.00E+04	9.29E-03	2
di-n-octvlohthalate	NA	7.30E+01		na	ΑN	1.50E+05		a E
benzo(b)fluoranthene	AN	2.17E-02		na	A A	AN		g L
henzo(k)fluoranthene	AN AN	2.17E-01		na	A V	AN		g
henzo(a)nyrene	NA	2.17E-03		na	A V	7.50E+03		na
indeno(1.2.3-cd)nyrene	ΑN	2.17E-02		na	A V	ΝΑ		<u>e</u>
dihenz(a h)anthracene	ĄN	2.17E-03		na	NA	3.00E+04		па
henzo(a, h. i)berylene	AN	N		na	AA	3.00E+04		a a
TO-13 (PAHs)					1.5	1000	1 POE OF	Ş
naphthalene	4.35E-03	3.13E+00	1.39E-03	2	1.41=+00	7.00E+U4	1.00-103	
acenaphthylene	3.06E-04	N N		na	9.92E-02	2.00=+02	4.90E-04	2 2
Acenaphthene	3.59E-05	2.19E+02	1.64E-07	2	1.16E-02	1.25=+03	9.316-00	2 2
fluorene	1.27E-04	1.46E+02	8.72E-07	2	4.13E-02	7.50E+04	5.51E-U/	2
nhananthrene	1.03E-04	N		na	3.33E-02	2.00E+03	1.6/E-U5	2
anthracene	1.72E-05	1.10E+03	1.57E-08	n0	5.59E-03	6.00E+03	9.31E-07	2
fluoranthene	1.30E-04	1.46E+02	8.89E-07	9	4.21E-02	3.00E+01	1.40E-03	2
pyrene	1.86E-04	1.10E+02	1.70E-06	2	6.04E-02	1.50E+04	4.02E-06	2 2
benzo(a)anthracene	4.09E-05	2.17E-02	1.88E-03	2	3.09E-02	9.00E+0Z	3.10E-03	2 2
chrysene	4.21E-05	2.17E+00	1.94E-05	2	3.19E-02	2.005+02	1.335-04	2 2
benzo(b)fluoranthene	6.62E-05	2.17E-02	3.05E-03	2	1.23E-02	X.		2 2
benzo(k)fluoranthene	3.86E-05	2.17E-01	1.78E-04	2	7.31E-03	¥.		
Benzo(e)pyrene	1.86E-04	NV		na	1.51E-02	AN L	707.00	<u>a</u>
henzo(a)byrene	5.72E-05	2.17E-03	2.64E-02	2	4.33E-02	7.50E+03	5.78E-U0	2
indeno(1,2,3-cd)pyrene	6.17E-05	2.17E-02	2.85E-03	2	1.17E-02	NA Post	4 755 07	2 2
dibenz(a.h)anthracene	6.92E-06	2.17E-03	3.19E-03	2	5.24E-03	3.00E+04	1.75E-07	2
benzo(g,h,i)perylene	2.74E-04	N		밀	8.90E-02	3.00=+04	Z.9/E-U0	2
Dioxins and Furans						00.707.0		3
2378-Tetrachlorodibenzo-p-dioxl _i	NA	4.48E-08		na	AN A	3.305+00		<u> </u>

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

		Cartric	ige, 0.50 c DO	0 caliber, Tra DODIC: A571	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	7 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 1?	С _{асиtе} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV	> 1?
12378-Pentachlorodibenzo-p-dioxin	NA	N		na	AN	2.50E+00		na
123478-Hexachlorodibenzo-p-dioxin	NA	N N		na	NA	NA		na
123678-Hexachlorodibenzo-p-dioxin	NA	N/		na	NA	1.50E+01		na
123789-Hexachlorodibenzo-p-dioxin	ΑN	1.48E-06		na	NA	NA		na
1234678-Heptachlorodibenzo-p-dioxin	3.59E-09	N		na	2.92E-07	NA		na
OCDD	6.05E-08	ΛN		na	1.96E-05	1.50E+02	1.31E-07	2
2378-Tetrachlorodibenzo-p-furan	NA	N		na	NA	2.00E+00		па
12378-Pentachlorodibenzo-p-furan	NA	NV		na	NA NA	NA		па
23478-Pentachlorodibenzo-o-furan	ΝA	ΛN		na	NA NA	7.50E-02		ng
123478-Hexachlorodibenzo-p-furan	NA	ΛN		na	NA A	7.50E+00		па
123678-Hexachlorodibenzo-p-furan	ΑN	ΛN		na	NA	2.50E+00		Б
123789-Hexachlorodibenzo-p-furan	ΑN	ΛN		na	NA A	NA		na
234678-Hexachlorodibenzo-p-furan	ΝΑ	ΛN		na	N A	1.50E+00		па
1234678-Heptachlorodibenzo-p-furan	1.08E-09	Ν		na	8.77E-08	AA		na
1234789-Heptachlorodibenzo-p-furan	¥.	N		na	ΑN	NA		na
OCDF	3.70E-09	NV		na	1.20E-06	3.00E+02	4.01E-09	ရ
Energetics								
Nitrobenzene	NA	2.09E+00		na	ΔN	1.51E+04		na
2-Nitrotoluene	NA	3.65E+01		na	NA	AN		na
3-Nitrotoluene	Ν V	3.65E+01		na	ΔA	ΑΝ		na
4-Nitrotoluene	AN	3.65E+01		na	AN A	3.37E+04		g
Nitroglycerine	NA	4.80E-01		na	AN	AN I		na
1,3-Dinitrobenzene	NA	3.65E-01		na	₹ Z	3.00E+03		na
2,6-Dinitrotoluene	NA	3.65E+00		na	AN :	6.00=+02		E G
2,4-Dinitrotoluene	NA A	7.30E+00		na	¥.	6.00E+02		2
1,3,5-Trinitrobenzene	NA	1.10E+02		na	Y S	3.00=+04		19
2,4,6-Trinitrotoluene	NA	2.24E-01		na	ΑN	2.50E+04		E
RDX	NA	6.11E-02		na	ΑΝ	AN .		na
4-Amino-2,6-Dinitrotoluene	NA	N<		na	NA A	NA NA		g
2-Amino-2,6-Dinitrotoluene	NA	>N		па	AN	1.50E+04		na
Tetryl	NA	3.65E+01		па	AA	NA NA		na
HMX	AN	1.83E+02		па	AN	NA P		na
Pentaerythritoltetranitrate	NA	N		g	AN	5.00E+01		Ja
Dibutyl Phthalate	NA	3.65E+02		g	NA NA	1.50E+04		па
			•					

Table D-3: Comparison of Modeled Air Concentrations with Health-Based Values (M17) - 200 meter location

		Cartric	1ge, 0.50 c DC	aliber DIC: /	Cartridge, 0.50 caliber, Tracer, M17 (M2) DODIC: A571	7 (M2)		
Compound	C _{chronic} (µg/m³)	Health-Based Screening Level (µg/m³)	C _{chronic} / HBSL	> 12	С _{асите} (µg/m³)	Acute Toxicity Value (µg/m³)	C _{acute} / ATV > 1?	> 1?
Dioctvl Phthalate	Ā	4.80E-01		na	NA	1.00E+04		na
Diphenylamine	NA	9.13E+01		na	NA	3.00E+04		g

Footnotes:

NA: Not applicable because compound was not detected

na: Not available because health-based sceening value is not available or not applicable if compound was not detected

NV: No value available

C_{chronic}: Chronic time-averaged concentration

HBSL: Chronic health-based screening level

Cacute: Acute concentration

ATV: Acute toxicity value

Table D-4: Comparison of Modeled Air Concentrations with Health-Based Values (M17): Total Petroleum Hydrocarbons - 200 meter location

	Cal	niridge '0'50 callib 	icaniiidge 0.60 callisen Iliacen WHT (M2) 	
Compound	C _{chronic} (µg/m³)	C _{chronic} (µg/m³)	С _{chronic} (µg/m³)	C _{chronic} (µg/m³)
	Zylfonatice@<	Allphaffc C>8	Aromatic:C<=8	Aromatic:C>8
Darmanent Gases	A STATE OF THE PROPERTY OF THE STATE OF THE			
Pentane	3,44E-04	NA	AN	AN
Renzepe	AN	AN	1.20E-01	NA
Pelizerie	NA A	AA	1.36E-02	NA
alianio I	AN	AN	1.09E-03	NA
Ethylbenzene	ΔN	ΝΑ	2.07E-03	AN
m&p-Xylene	AN	NA	1.69E-03	NA
o-Aylene	ΔN	NA NA	AN	4.13E-03
Styrene	VIV.	AN	Ą	3.78E-04
1,2,4-Trimethylbenzene	2 44 00	AN	NAN.	NA
Propylene	7 72E 02	AN	NA NA	NA
n-Hexane	1.125-02	ΔN	AN AN	6.96E-03
naphthalene	¥N.		AN	4.35E-03
naphthalene	NA .	Z 2	AN	3.06E-04
acenaphthylene	NA S	¥	AN	3.59E-05
Acenaphthene	AN :		AN	1.27E-04
fluorene	AN .	₹ <u>₹</u>	AN	1.03E-04
phenanthrene	42	ΔN	NA	1.72E-05
anthracene	L	SIN VIN	ΦN	1.30E-04
fluoranthene		VAI	70 100	A CELL OO
Total (ug/m³)		0.00E+00	1.39E-01	1.00E-02
Derived Health-Based Screening Level	1.92E+04	1.04E+03	4.17E+02	2.09E+02
C _{chronic} /HBSL	5.14E-06	0.00E+00	3.33E-04	7.93E-05
>15	no	no	no	no
Footnotes: >10 = Is the ratio greater than one?				

>1? = Is the ratio greater than one?

NA = Not Applicable because compound was not detected

C_{chronic} = chronic averaged air Concentration

HBSL = Health-Based Screening Level

APPENDIX E

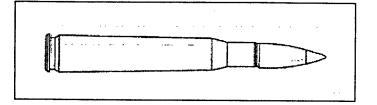
FACT SHEET SUBMITTED TO THE U.S. ARMY ENVIRONMENTAL CENTER

U.S. Army Environmental Center Training Munitions Fact Sheet

M17 .50 Caliber Tracer Cartridge

Department of Defense Identification Code: A571

Breathing air emissions from the M17.50 caliber tracer cartridge will not impact the health of residents who live as close as 200 meters (656 feet) from the firing location.



To be fully prepared to protect our country, U.S. soldiers must train with many different weapons and munitions, including the M17 .50 caliber tracer cartridge. This training is important because it helps prepare our soldiers for a variety of combat situations. While the Army recognizes the value of such comprehensive training on our installations, we also work hard to ensure the safety and health of surrounding communities.

WILL BREATHING AIR EMISSIONS FROM THE M17 .50 CALIBER TRACER CARTRIDGE AFFECT MY HEALTH?

To answer this question, the U.S. Army tested the air emissions that are released when the M17 is fired. The information gathered during these tests was then analyzed to determine if there would be a potential for health effects from inhalation to residents who live near training areas. Study results, generated using conservative methods, showed that offsite residents breathing air as close as 200 meters (656 feet or about the length of two football fields) from the firing location are safe from these emissions. If offsite residents are located less than 200 meters from the firing locations, a more site-specific evaluation would be necessary. It should be noted that at most locations, training areas are at least 1,000 meters (over half a mile) away from populated areas and the distance to firing locations may be even farther.

How Was THE STUDY CONDUCTED?

To gather data for this study, the M17 was fired from the M2 machine gun in a test chamber. The air in the chamber was then tested to identify the types and amounts of substances released. About 300 different substances were looked for during this part of the study.

This information was then used in an U.S. Environmental Protection Agency (USEPA) approved air model (a computer program that allows estimation of air concentrations) to determine the amount of each substance to which someone

living near a training site might be exposed. Downwind concentrations were estimated based on a typical use scenario for the M17 during training exercises. Since this study did not look at any one specific training area, the assumptions used in the model would, in most cases, predict higher downwind air concentrations than those expected at an actual training site.

These estimated air concentrations were then compared to screening levels established by the U.S. Environmental Protection Agency and other federal agencies. If the air concentrations are less than these screening levels, they are considered safe for the general population, including sensitive people such as the sick, elderly, and children.

WHAT ARE THE STUDY LIMITATIONS?

Many steps were taken to ensure that the results of this study are protective of residents who live near training facilities. However, as with any study, this study has limitations. For example, the study does not consider exposure to other types of munitions that could also be used during the same training event. Due to these limitations, conservative model conditions were used to ensure the protection of public health from breathing M17 air emissions.

WHAT EXACTLY IS THE M17.50 CALIBER TRACER CARTRIDGE?

The M17 is a tracer cartridge used to track the path of a bullet. When fired at night, the tracer leaves a visible trail to show the direction in which the bullet is traveling. The M17 has a brass cartridge case and a bullet consisting of a brass jacket and steel core. The cartridge contains a propelling charge that is made up mostly of nitrocellulose. Nitrocellulose is commonly used in furniture lacquers, printing inks, nail polish, and as a primary ingredient in smokeless propellants for military and commercial use. Each M17 cartridge is about the length of a soda can and can be identified by its brown tip.

WHERE CAN I GET MORE INFORMATION?

For more information on the M17 or other military munitions, please call the Army Environmental Hotline at 1-800-USA-3845, visit our Web site at www.aec.army.mil, or e-mail t2hotline@aec.apgea.army.mil.